SINCE 1930 ASTOUNDING

April 1988 $2.00 U.S./$2.50 CAN.

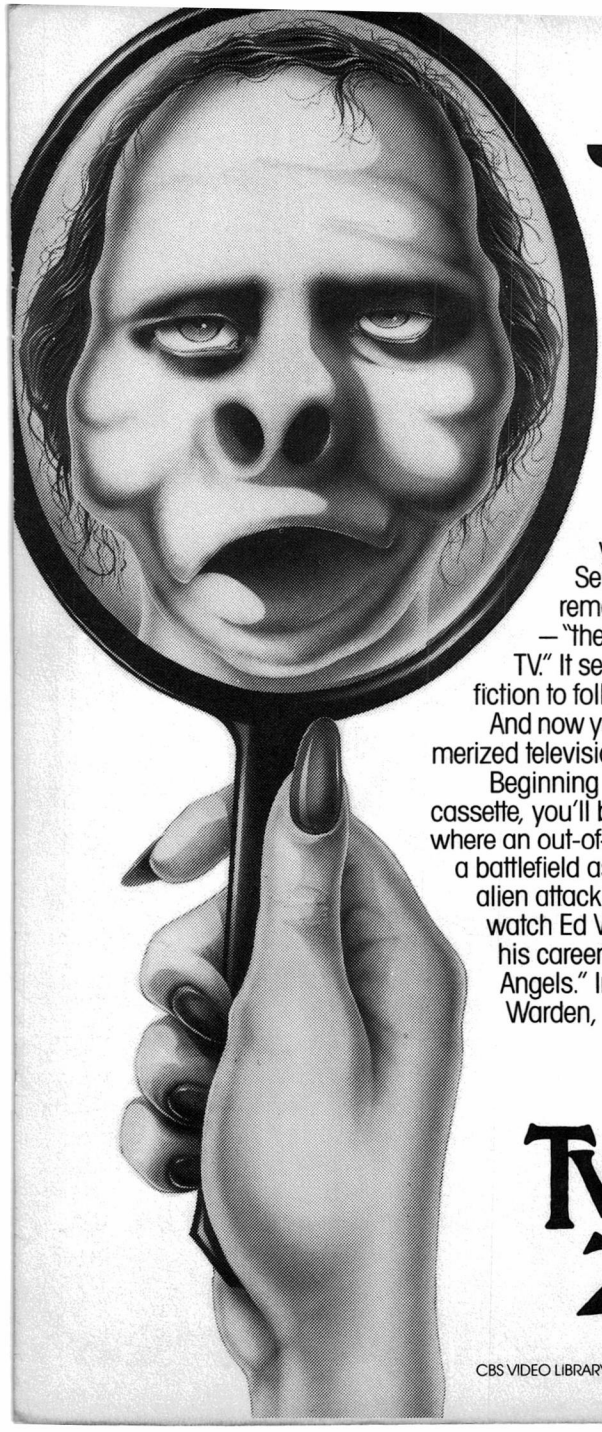
# SCIENCE FICTION analog SCIENCE FACT®

## W. R. THOMPSON
Second Contact

## MICHAEL A. McCOLLUM

## MICHAEL F. FLYNN


0 02028 04
387168



# JOURNEY IS IN THE

Come face to face with a new meaning of beauty, a meaning that exists only in *The Twilight Zone*. And enter a dimension where the ugly are normal and the beautiful are damned.

Created some thirty years ago by the genius of Rod Serling, *The Twilight Zone* remains as the critics described it — "the most imaginative half hour in TV." It set the standard for all science fiction to follow.

And now you can visit the place that mesmerized television viewers everywhere.

Beginning with your first four-episode cassette, you'll be transported to a dimension where an out-of-the-way farmhouse becomes a battlefield as Agnes Moorhead fends off an alien attack in "The Invaders." Then you'll watch Ed Wynn make the sales pitch of his career to Mr. Death in "One For The Angels." In "The Lonely," starring Jack Warden, you'll see a man's love bring a

# THE TWILIGHT ZONE

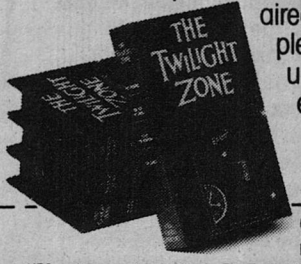
CBS VIDEO LIBRARY 1400 North Fruitridge Ave., Terre Haute, IN 47811

# TO WHERE BEAUTY EYE OF THE BEHOLDER.

robot to life. And, of course, "The Eye Of The Beholder" gives a bizarre new twist to an old saying.

It's all yours for only $4.95 plus shipping and handling when you subscribe to the series.

Then, about every four to six weeks you'll receive another four-episode videocassette. You'll see Talky Tina menace Telly Savalas in "The Living Doll" and William Shatner take the plane ride of his life in "Nightmare at 20,000 Feet." What's more, you'll watch each episode as it originally aired—complete and uncut. Plus each cassette arrives in an exclusively designed matching case, so the Collection will look great on any bookshelf.




Your visit to *The Twilight Zone* is risk-free, too. Take 10 days to preview each cassette and pay just $29.95 plus shipping and handling for each one you decide to keep. There's no minimum to buy and you can cancel your subscription anytime.

Cross over to where fantasy and reality merge. Mail the coupon, or for faster service, call toll-free (credit card orders only) 1-800-CBS-4804 (in Indiana, call 1-800-742-1200). And get ready to enter *The Twilight Zone*, a new dimension in entertainment.

**Take your first videocassette for only $4.95**
(plus shipping and handling with subscription)

## CBS VIDEO LIBRARY

Dept. TDN, P.O. Box 1111, Terre Haute, IN 47811

YES, enter my subscription to *The Twilight Zone* under the terms described in this ad. Send me my first videocassette (four episodes) at the low introductory price of $4.95 plus $2.45 shipping and handling, which I'm paying as indicated below (*fill in*). Also, send me future videocassettes (at $29.95 plus $2.45 shipping and handling) on ten-day approval, with no obligation to purchase.

Check One: ☐ **VHS** ☐ **BETA**

Check how paying:

☐ **CHECK ENCLOSED** FOR $7.40* ($4.95 + $2.45). Future cassettes billed with shipment.

☐ **CREDIT CARD.** Charge my series purchases, beginning with $7.40* for my first cassette, to: ☐ American Express ☐ VISA ☐ MasterCard ☐ Diners Club

T13
T14

Account # _____ Expires _____

Signature _____

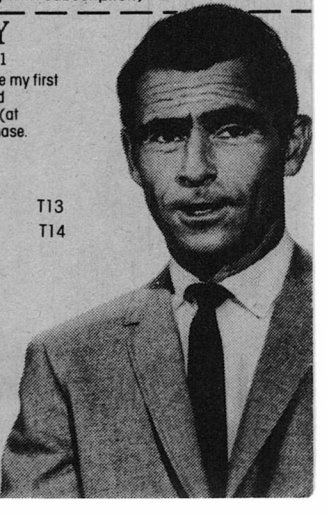
NAME _____
(please print)

PHONE (  ) _____

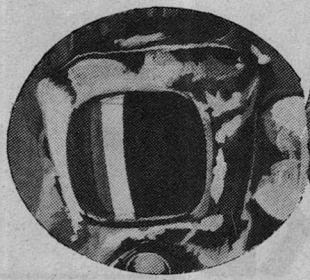
ADDRESS _____ APT _____

CITY _____ STATE _____ ZIP _____

Note: CBS Video Club reserves the right to reject any application or cancel any membership. Offer limited to continental U.S. (excluding Alaska) and Canada. Canadian residents will be serviced from Toronto (offer may vary). **Applicable sales tax added to all orders.**

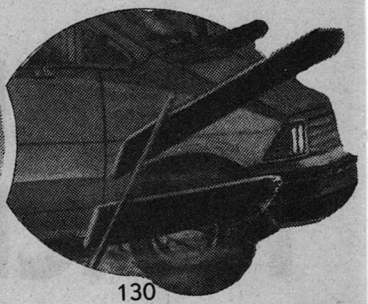


# analog



10

80



130

Vol. CVIII No. 4
April 1988

Next Issue on Sale
April 5, 1988

$19.50 per year in U.S.A.
$2.00 per copy in U.S.A.



Cover by Nicholas Jainschigg

**Joel Davis,** President

**William F. Battista,** Publisher

**Stanley Schmidt**
Editor

**Tina Lee**
Associate Editor

**Indicia on Page 6**

# Editorial

# THERE'S NO PLACE LIKE____

## Stanley Schmidt

Whenever I get a chance to spend some time in a part of the world where I haven't spent much before, I try to take full advantage of it. After last August's World Science Fiction Convention in Brighton, England, for example, I felt a solemn obligation to wander around Great Britain, sampling the life and land of England and Scotland. Even though I didn't have a lot of time for the trip, I wasn't disappointed. I seldom am. I find almost any new place a fascinating source of new ideas, information, and experiences, from different kinds of landscapes to the plants and animals that live there to the varied ways human beings have found to live. All of this seems to me not only grist for a writer's mill, and fun, but a valuable contribution to any sentient being's understanding and appreciation of his or her own place in the universe.

So I was a bit startled by a bit of conversation I overheard one evening in a four-hundred-year-old country inn where we stayed. Several of the current residents were sitting around the lounge where coffee and tea were offered after dinner, and a small group at the far end of the room were comparing notes on their own travel experiences. One of them, an apparently intelligent, earnest, elderly woman, admitted she had never even been to Scotland, but added that she didn't really see much reason to go anywhere else because (and I quote), "There's no place like England, is there?"

And I thought, "Well, of course not. There really is no place like England—or Tanzania, or Australia, or Antarctica, or even New Jersey."

Which is precisely *why* people travel. If other places were just like home, there

wouldn't be much point in spending time and energy to go to them. It's worthwhile only because other places have things to offer which you *can't* get at home, be they scenery, hard goods of commerce like ores or spices, or the intangible benefits of seeing firsthand that your culture's ways aren't the *only* ways.

That last lesson is one virtually everyone needs to be reminded of from time to time—not least, I suspect, that lady in the English inn. I suspect she didn't really mean that there's no place *like* England so much as that there's no place as *good* as England. But either way, if she's never been anywhere else, how would she know?

I'm not picking on her personally; I don't even know who she is, and what I see as her shortsightedness is ignorance, not evil. Nor am I suggesting that this kind of shortsightedness is either characteristic of or peculiar to the English. I've seen plenty of it among Americans; and if you live somewhere else, I don't doubt that you've seen it there, too. And it doesn't stop with concerns the size of nations. It may, in fact, be one of the more insidious obstacles to our species' getting out of its cradle.

"Why go into space?" seems to be the essence of many of the anti-space-program arguments we've all heard. "After all, there's no place like Earth!"

True enough, at least locally. At least in this Solar System, we can state quite confidently that there is no other piece of real estate that offers living conditions at all similar to those we're accustomed to on Earth. For some of us, that's an attraction. We can hardly wait to see all the *different* kinds of places that exist out there. But for many others (including many who control the money that will be needed to *get* out there) if you can't build condoes on it, it's worthless. As long as that attitude is prevalent, it's going to be *hard* to get out there.

Fortunately there are other financial incentives that can help to erode that kind of resistance. I mentioned ores and spices, and there are businessmen finally beginning to realize that other parts of the Solar System can at least provide ores. Where there are mines, there are likely to be miners (though the development of automation makes that correlation far less clear and unequivocal than it once seemed). To the extent that humans are involved in materials processing and manufacturing in low-Earth orbit or on the Moon or among the asteroids, they will learn to live in those environments. Some will even learn to like them, and their enthusiasm will attract still others with similar tastes.

Tastes do differ, so not all environments will be equally attractive to all people. Personally, I don't think I'd like living permanently in an all-artificial orbital habitat—but then, I wouldn't want to live in New York City, either. Millions of others do and love it, and I'm glad that both they and I have managed to find places we like to live. One of the biggest benefits the colonization of space and other planets will bring is an even wider *choice* of places to live—and visit. Even though I wouldn't

want to live in New York City, I very much like being able to visit it from time to time—and the same would be true of an O'Neill colony.

I have no doubt that once that wider range of choices is available, the inhabitants of every one of them will include their own counterparts of the lady in the inn. Earth, L5, Luna, Mars, the asteroids—each will have residents who firmly believe that their little slice of the universe is so special and so superior to all others that there is no point in going anywhere else. This attitude may sometimes even be beneficial. If, for whatever reasons, you *can't* go anywhere else, there are definite advantages to being able to be content with where you are. Under those circumstances, the belief that Home Is the Only Place


**STANLEY SCHMIDT** ..... Editor
**TINA LEE** ..... Associate Editor
**EMY ETERNO** ..... Editorial Assistant
**RALPH RUBINO** ..... Corporate Art Director
**TERRI CZECZKO** ..... Associate Art Director
**ANTHONY BARI** ..... Junior Designer
**DENNIS DOYLE** ..... Junior Designer
**CAROLE DIXON** ..... Production Manager
**ROBERT J. ALLEN** ..... Production Assistant
**CYNTHIA MANSON** ..... Director, Subsidiary Rights
**FLORENCE B. EICHIN** ..... Manager, Contracts & Permissions
**VEENA RAGHAVAN** ..... Public Relations Promotions Manager
**SONYA CASTELLUCCI** ..... Circulation Director/ Retail Marketing
**PAUL CHRISTIAN** ..... Circulation Planning Director
**LAURA GUTH** ..... Circulation Director/ Subscriptions
**CHRIS DORBANDT** ... Newsstand Operations Manager
**RISA LUND** ..... Advertising Services Manager

Published since 1930.

**JOEL DAVIS**
President

**FRED EDINGER**
Senior Vice President
Finance

**PAULA COLLINS**
Senior Vice President
Circulation

**CARL BARTEE**
Vice President
Manufacturing

**STEPHEN POLICOFF**
Assistant Vice President

First issue of *Astounding* January 1930. ©

**WILLIAM F. BATTISTA**
Publisher

**ADVERTISING OFFICES NEW YORK**
(212) 557-9100

Analog Science Fiction/Science Fact (Astounding) is published 13 times annually by Davis Publications, Inc. at $2.00 a copy in U.S.A., $2.50 in Canada. Annual subscription $19.50 in the U.S.A. and possessions, in all other countries, $24.20 payable in advance in U.S. funds. First copy of new subscription will be mailed within eight weeks of receipt of order. When reporting change of address allow 6 to 8 weeks and give new address as well as the old address as it appears on the last label. Second-class postage paid at New York, NY, and at additional mailing office. Canadian 3rd class postage paid at Windsor, Ontario.



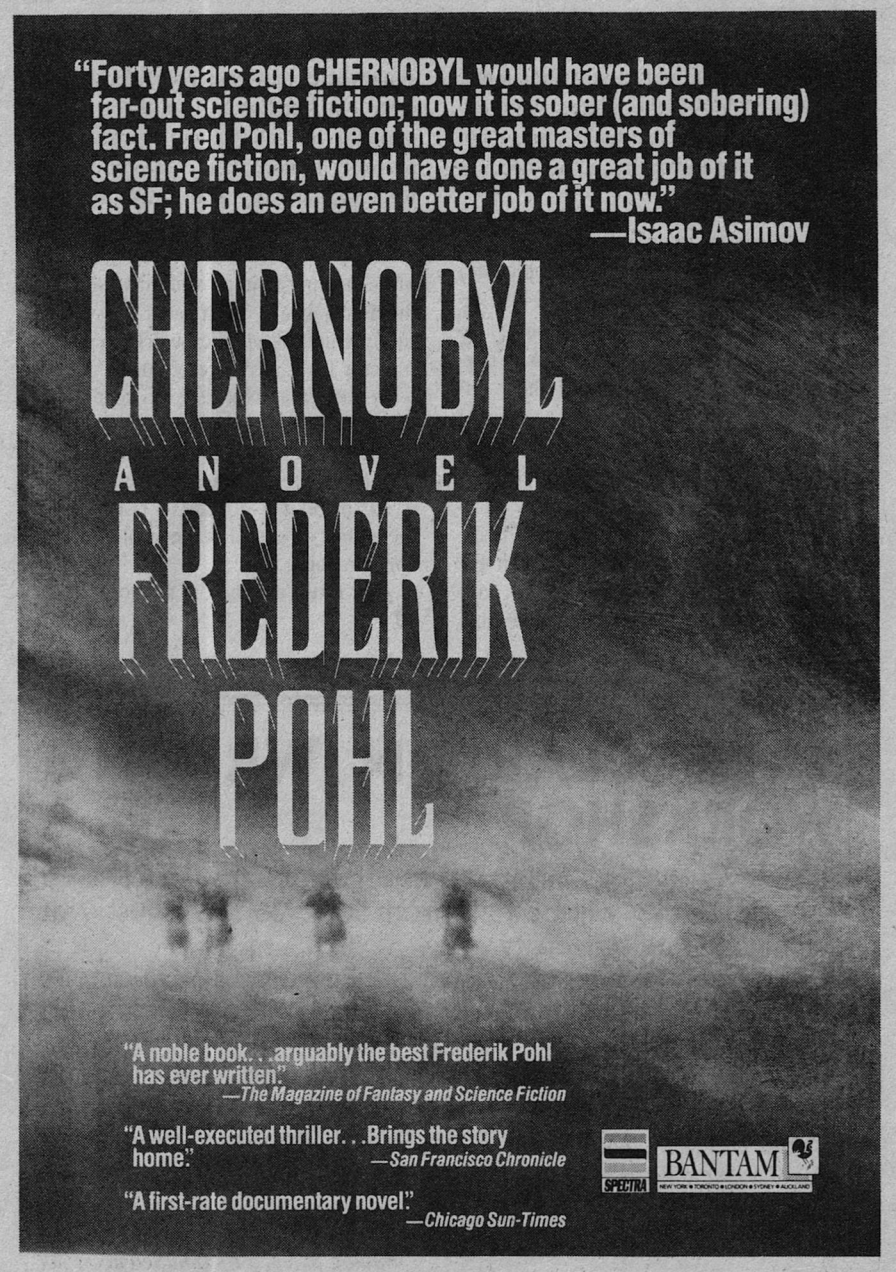
POSTMASTER: SEND FORM 3579 to ANALOG SCIENCE FICTION/SCIENCE FACT (ASTOUNDING) P.O. BOX 1936, MARION, OH 43306

IN CANADA RETURN TO 628 MONMOUTH ROAD, WINDSOR, ONTARIO N8Y 3L1

Editorial and Advertising: Analog Science Fiction/Science Fact, 380 Lexington Avenue, New York, NY 10017

Subscriptions: Analog Science Fiction/Science Fact, P.O. Box 1936, Marion, OH 43306 ISSN 0161-2328

**Call (614) 383-3141 for problems with your subscription.**


"Forty years ago CHERNOBYL would have been far-out science fiction; now it is sober (and sobering) fact. Fred Pohl, one of the great masters of science fiction, would have done a great job of it as SF; he does an even better job of it now."
—Isaac Asimov
CHERNOBYL
A NOVEL
FREDERIK POHL
"A noble book. . .arguably the best Frederik Pohl has ever written."
—The Magazine of Fantasy and Science Fiction
"A well-executed thriller. . .Brings the story home."
—San Francisco Chronicle
"A first-rate documentary novel."
—Chicago Sun-Times
SPECTRA
BANTAM
NEW YORK • TORONTO • LONDON • SYDNEY • AUCKLAND

Worth Being might qualify as a "useful delusion." But the fact will remain that there are a lot of other places worth experiencing, if the opportunity arises—not because they are *like* home, but because they are different.

And even though every time and place will probably produce people who see no value in that, there will also be others who do. *That* attitude — compounded of varying amounts of curiosity, adventurousness, and sheer enjoyment of natural and artificial diversity—will be a major force driving our eventual expansion through the Solar System.

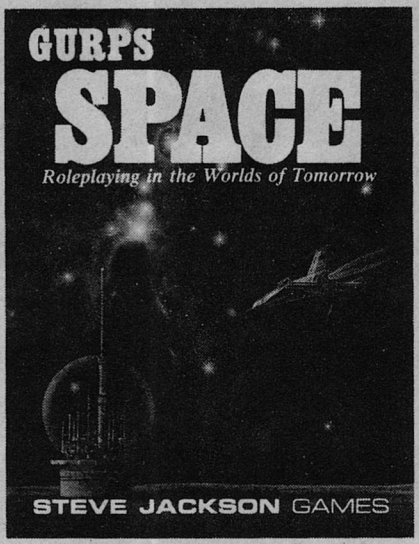
And beyond.

And beyond? Out there is room for *millions* of Solar Systems, filled with planets and other oddments. There may be so many that one of those planets, somewhere, may even coincidentally be quite a lot like Earth. If so, that fact will make it an interesting curiosity and probably a more than commonly comfortable place (by planet-dwelling humans' standards) to live. But its differences will almost certainly still be more striking than its similarities. Even the Earth itself, as it is at any given time, would be an alien world to a time traveler from any other century.

In any case, worlds even that much like Earth will be very, very rare. Most of the worlds out there will be a good deal more exotic. For some people, that is sufficient reason not to bother with them. For others, it is the strongest reason for going.

And those are the ones who will go. ■

# Create Your Own Universe!




*GURPS*, the *Generic Universal RolePlaying System*, already covers the worlds of horror, fantasy, post-holocaust adventure, and more. Steve Jackson now presents the long-awaited roleplaying sourcebook for the worlds of the future: *GURPS Space*.

This 112-page book has all the rules and background you need to create a universe to *your* specifications . . . or to recreate any of your favorite science fiction stories with a gaming background. Use it with the *GURPS Basic Set*, or as a sourcebook for any other game system.

*GURPS Space* includes detailed, state-of-the-art scientific guidelines for building star systems and habitable worlds; flexible rules for starship design and combat; high-tech weapons from light swords to plasma guns; scaly aliens and variant humans; effects of FTL technology on interstellar society; and much more.

*GURPS Space* and the *GURPS Basic Set* are available at your favorite hobby store. Or order by mail (prices include shipping and handling): $13.50 for *GURPS Space*; $27.50 for the *Basic Set*. (Texas residents, please add $1.00 or $2.20, respectively.) Send a long SASE for a free catalog.

**STEVE JACKSON GAMES**
Box 18957-J Austin, TX 78760


2024

# SECOND CONTACT

W. R. Thompson

How durable a culture is is largely a matter of attitude—and one of the more useful attitudes is that damage is not necessarily final.

Nicholas Jainschigg

There was going to be a war.

The Neutral Zone wasn't part of the Republic, not yet, but we sent patrols into it all the time. Our scout teams let us know if any invaders or bandits were near our borders, and the presence of our forces intimidated most troublemakers. Equally important, the patrols protected the people who lived between us and the barbarian kingdoms. Everyone deserves some security in this life; that's why governments exist.

The people in this commune hadn't had any safety. The raiders had encircled them and attacked, overrunning the hamlet before it could defend itself. A few of the local folks had died fighting, but it didn't look as if they'd drawn blood. Footprints showed that the attackers had marched north, taking the survivors with them—as slaves, or worse.

"They were Weyler's men," Colonel Washington said, holding up an arrow he'd found. "See the tip, Mr. Secretary? And the 'feathers'? Nobody else makes arrows like this."

"I know, Colonel." I took the arrow and studied it, not because I could learn anything from it, but because I wanted to stall. The arrow was a hand-turned wooden dowel, given its point on a pre-Collapse pencil sharpener. The feathers had been cut from old soft-drink cans, and laced to the shaft with sinew.

"Maybe Weyler's bully-boys didn't do this," I said. I was clutching at straws. "Other bandits might have bought the arrows from him, or taken them as booty."

"That's possible, sir," Washington said. His tone said he put more faith in the Easter Bunny, and he was right. Nobody sells weapons these days; the buyers are liable to turn around and kill you with them. If anyone had defeated and robbed some of Weyler's men, our spies would have heard.

Just the same, I wanted to believe that the raiders were nomads. The Republic might ignore that, but if they were locals, we would soon be at war with them—and I didn't want to see the Republic fall into another war. That may sound like an odd attitude for a secretary of war, but my attitude was the reason I'd joined the Structuralist Party and accepted this post.

"Colonel!" One of Washington's scouts signaled us from the edge of an orchard. "We've got something, sir."

Washington and I walked into the orchard. It was a straggling, threadbare clump of apple trees. There was a large empty patch in the center of the grove, and a carved wooden pole had been driven into the dirt.

"A pagan war totem," Washington said in distaste. He pulled it from the ground, looked it over and handed it to me. "And these are Weyler's marks."

"So they are." Triple flames were carved in the soft wood, the same symbol Weyler's men paint on their chests and leather shields. The top of the pole had been carved into the nightmare shape of an Alien's head.

The face mocked us. Human civilization had folded up at its first contact with other worlds, it seemed to say. What made us think we could revive society? Weyler had chosen that symbol deliberately, to remind us how fragile our culture was, and how certain he was of ultimate victory.

I couldn't delay forever. We would have to go home and inform the Leg-

islature. They would debate, but in the end they would declare war. I wish I could say I was entirely unhappy at the prospect.

The Legislature meets once a month, in the Forum Building: a barnlike structure which can seat up to five hundred people. It cost us a lot to build the Forum, both in material and work hours, but nobody begrudges the expense. A government body has to meet somewhere—and as anyone in the Republic can tell you, this is *our* government.

That doesn't always make it pleasant.

I was sitting on the stage, rather than on the main floor with the other Legislators. Colonel Washington stood at the podium in front of the speaker's chair, where he was winding up his testimony. He stood at parade rest, seemingly unfazed by the hostile faces in the amphitheater. "By the time the burial detail had finished tending to the dead villagers, the sun was setting. We scouted the area, determined that no hostile forces remained nearby, and made camp. The next day we returned to Northfort. That's all."

The questioning began at once, as several legislators rose to their feet. The speaker pointed her gavel at one of them. "The chair recognizes Gwen Parsons."

"Thank you, Madam Ryan." The leader of the Expansion Party gave the speaker a polite nod—solely out of deference to her position. Kate Ryan is the leader of my party, and the EPs don't like the fact that we outnumber them three to two.

At the moment Parsons seemed pleased, as well she might. I had gone on this scouting trip as an observer, but my actions—or lack of them—could give the Expansionists the leverage they needed to take control of the government.

Parsons faced the Colonel and raised her voice. "Colonel, by your estimate the raiders took over fifty captives. What became of them?"

Washington's brown face remained inscrutable. "This was obviously a slaving raid. The only possible conclusion is that the villagers were taken to Weyler's territory."

"Why didn't you pursue the raiders?" Parsons demanded. The acid in her voice surprised me at first. Aside from being one of the Founders, and the man who helped defeat the Aliens, he's the head of our militia. The Expansionists favor the use of military force to extend our domain; Parsons couldn't want to offend the Colonel.

My surprise lasted perhaps two seconds. Parsons wasn't attacking Colonel Washington; she was after *me*—and the Structuralists, through me.

"I had several reasons for not giving pursuit," Washington said. "By my estimate, the raiders had a full day's start on us. By the time we could have caught up with them, they would have been deep within Weyler's territory. I had a force of eight scouts, one automatic rifleman, and a limited supply of ammunition. I would have faced forty raiders, in addition to probable reinforcements. A rescue attempt would have been suicide."

"But you might have freed those hostages." An approving murmur answered Parsons, and some of my fellow Structuralists nodded agreement. I

couldn't hold that against them. I wasn't sure myself that restraint had been the right move.

"I considered that, ma'am," the Colonel said. "I also considered that a battle might have killed many of the people we wanted to save—and that the outlanders would rather kill slaves than free them. In addition, I have standing orders to remain in the Neutral Zone."

Parsons shifted her attack. "You had an observer on this patrol. Didn't Secretary Woodman have anything to say about your decision?"

"Ma'am, I didn't consult him. Civilian observers have no place in making tactical decisions."

"This particular civilian is also the secretary of war," Parsons countered. "That also makes him your superior. Why didn't he countermand your orders?"

Ryan rapped her gavel on the bench. "Madam Parsons, that question is out of order."

Parsons looked at her. "May I address it to Mr. Woodman?"

"Yes." Ryan nodded for me to take Washington's place.

Before the Collapse, I'm sure, the podium would have had a hot, bright light focused on it. We don't have such luxuries, but I felt as hot and naked as if I'd been pinned under a spotlight. Parsons eyed me for a moment as I stood at the podium. "Mr. Woodman, why didn't you countermand the Colonel's orders?"

"I don't countermand common sense," I told her bluntly. "And I have no authority to order the colonel to leave the Neutral Zone. I'm not empowered to start wars; that's the Legislature's duty."

That gave the EP chief pause—briefly. "Perhaps . . . but Weyler has *de facto* started a war—and a raid, even if it failed, would have shown our determination to revive civilization. That's the goal of both our parties, no matter how much we disagree on techniques."

Ryan rapped her gavel again. "Please, madam, no speeches during questioning."

"My apologies, madam." Even at this distance I could see the sardonic touch to her smile. "My point is that the outlanders invaded the Neutral Zone and took slaves. So far all this government has done is to bury the dead. Mr. Woodman, what *do* you propose to do?"

She had me—and the Speaker, and the whole Structuralist Party—neatly trapped with that question. "As secretary of war, I'll follow the government's decisions. As a legislator and citizen, I favor any solution which will stop the raids—without endangering the Republic."

"Ah, yes." Parsons's voice was just this side of a sneer. "I have no further questions, Madam Ryan—but I would like to make a motion." The other legislators sat down at once. The EPs sat to let their boss make her motion; our people sat because there was no point in stalling—and perhaps because a good many of them agreed with what was coming.

Parsons looked around the Forum, spoke in formal tones. "Madam Speaker, fellow Legislators. In view of the Weyler raid, I move that we vote to declare

# JACK VANCE

# ARAMINTA STATION

Book One of
*The Cadwal Chronicles*

The planet known as Cadwal has, for centuries, been the home of two sharply divided societies—the inbred human scientific station at Araminta, and the alien city on Lutween Atoll, which considers Cadwal their own. The alien Yips seek to break the charter by which Cadwal is governed and to spread their culture across the planet. But young Glawen Clattuc, declared "excess personnel" by his clan and now a member of the Cadwal police force, may have alternate plans.

**"You can't possibly pass up any book by Jack Vance... He has perfected the trick of creating new worlds so deceptively real that after a while your own home seems imaginary."**

**—Jerry Pournelle**

**"Jack Vance is one of the finest writers that the science fiction field has ever known."**

**—Poul Anderson**

A Tor hardcover
0-312-93044-5 ★ 540 pages
$19.95

TOR

Tor hardcovers are nationally distributed
by St. Martin's Press

war on Weyler, depose him and annex his lands."

Ryan sighed, a sound I could barely hear from where I stood. "Are there any objections?" she asked, and then waited through a stony silence. "Very well, the motion carries. We will vote after debate tomorrow. This body is dissolved for twenty-four hours."

That gave me one day to stop a war.

I drink at the Crushed Alien for two reasons: the view and the food.

The inn has a dining terrace which overlooks my home district. Zone Twenty-nine isn't much to see, by day or night, but I'm fond of it. The main attraction is the chemical plant, which produces everything from fertilizer through medicine and gasoline to gunpowder. . . . all in inadequate amounts, I'll concede, but the output grows every year. Right now it produces enough to help support a nation of two million people, in a section of land that used to be Illinois.

The food? It's nothing fancy, which is a virtue. A lot of tavern cooks like to improvise pre-Collapse dishes, especially things that remind us oldsters of fast foods and other lost delights. That's not for me, thank you; I lost too much in the Collapse to dredge up old memories.

A tavern is also a good place for a politician to do business. An office intimidates some people, especially when they have to face you across a desk. Shooting the breeze over stew and ale is another matter, as long as you remember that nothing you hear is trivial—not to the voter who's saying it.

Pete Bodo, a farmer on the western edge of my zone, was bending my ear. "I don't care about this war talk," he said. "Either Weyler throws in the towel, or we stomp him. Either way, it's all going to happen a couple hundred miles from here. Besides I have other problems."

Collapse or no Collapse, midwesterners are isolationists at heart. I gave him an encouraging nod. "It's not the water pumps again, is it?"

"Naw. You really got engineering straightened out on that." He set his mug down on the table. "Someone in my neck of the woods is shooting cats. I lost two of my best ratters this past month."

"I see." Rats don't just eat crops, although farmers like Bodo have had granaries ruined by them. The bubonic plague which decimated the East Coast after the Collapse was spread by rats, and no one forgets that. Cats are our first line of defense against rats. "Do you suspect anyone?"

"Naw. All I know is, it's someone with a .410 shotgun." He pulled a brass casing from a pocket and gave it to me. "Found this on the road, fifty yards from one of my dead ratters."

I looked at the shell, and wished that we could afford the luxury of a police department and detectives. We were lucky to have as little crime as we did—or perhaps it wasn't luck. I'd read somewhere that vigorous, pioneering cultures have little crime. "A small gauge like this can't be too common," I said. "Maybe I can find out who bought it."

"Good. Well, I thank you, Tad." We shook hands and he left.

I doubt it occurred to Bodo that find-

ing his cat-killer would take a lot of my time. He was a dawn-to-dusk, light-of-the-moon farmer, the sort who thinks that no other farmer works half as hard as he does, and that all non-farmers are idle hands. Well, this would give me an excuse to nose around my zone and see how things stood.

I was almost finished eating when Gwen Parsons joined me. "Hello, Mr. Secretary," she said, seating herself.

"Mulch that, Gwen," I said. I suppose her formality was a way of apologizing for the debate, as if I might have taken it personally. Well, I *might* have, but I couldn't afford that. If I could convince *her* that a war was a bad idea, I'd gladly forget it. "What brings you out here?"

"You, of course." Gwen has the sort of face and voice that make everything she says sound deadly serious. "You know how the vote will go tomorrow, of course."

I nodded. "I'm still willing to act as though you might win anyway."

She acknowledged the hit with a crooked smile. "Tad, in the unlikely chance that we win, would you consider staying on as our secretary of war?"

I decided not to fence with her. "You don't have your own choice lined up?"

"I do," Gwen said, "But there are two good reasons to keep you. One, we traditionally have a coalition government during a war. Two, it always takes a month for a new appointee to learn the ropes. We're not going to wait a month to attack."

"Ah." Passions can cool in a month. She'd want to attack Weyler while everyone was fired up over the raid.

" 'Ah,' nothing, Tad," she said. "We have guns, poison gas, cannon, even aircraft. Weyler has bows and arrows, and so forth. Yet he's just provoked us. He expects a war with us—and no one starts a war with the idea that they're going to lose."

"He can't win."

"You're certain?"

I stared at the horizon for a long while. The sun had just set, and a few electric lights came on here and there: at the chemical plant, along the Main Concourse, atop the towers of the radio station. Most of the lights were decoration, but they helped show off our accomplishments.

"He *can't* win," I repeated. "We have the technology, the numbers, the organization—and the *will*. If we fight, we can grind his kingdom into a pulp."

Gwen rested her hands on the terrace table. "But you don't want to fight."

"It's wasteful. Expensive. It takes as many work hours to build a cannon as it does to make a tractor. A soldier can't spend his time teaching or smelting iron. We're trying to rebuild civilization; every resource we divert from that delays the job."

"So you want to toe the Structuralist line." She tilted her head back and looked at the sky. " 'Make war only in self defense; let the barbarians join us when they see the virtues of civilization.' "

I nodded. "Coercion doesn't work—the victims always resent it. The Republic is expanding nicely as it is. In a few more years, Weyler's people will be with us."

"Yes—after a few years of living with slavery, superstition, and Weyler's version of monarchy. What sort of cit-

izens will they be then? If we don't act fast . . .'' Her voice trailed off. She craned her head and looked straight up. ''Aw, nuts.''

I looked and saw it, right on the zenith: the feathery shape of a fusion flame, drifting across Earth's sky like a lazy comet. The Alien ship itself was a silver pinpoint at the head of the drive flame.

After a quarter of a century the Aliens had returned.

I'd known that the Aliens were real when the tabloid papers all declared they were a CIA-created hoax.

Marcia, my first wife, had been beside herself ever since the Alien drive flame was spotted decelerating into the Solar System. Now that I was convinced, she could stop quibbling over a trivial point and get down to some serious arguing. It was going to be the biggest event in our history, she said; even if the visitors forced us to take some strong medicine, they would do it with benevolence and in our best interests.

After a while I'd come to enjoy her optimism. As the UFO neared Earth, the news and entertainment media were filled with gloom and uncertainty. Along with some idiotic speculation on invasion and conquest from space, there was a lot of conjecture about possible dangers to our culture. In the space of two months I heard about every primitive culture which ever collapsed in the face of a superior civilization.

After all the media hype, *Scented Vine*'s arrival in Earth orbit was almost an anticlimax. There'd been an accident on board, they informed us, and they'd stopped here to make repairs. *Scented Vine* was a cargo ship, going from one unimportant star to another. It had been a long, rough trip, and the Aliens (they never told us what they called themselves) wanted to take shore leave.

We believed them. It was disappointing to know that our first contact was brought on by a leaky fuel line, but there was no helping that. Shore leave wasn't the scientific, diplomatic and cultural exchange everyone had envisioned, but it was better than nothing. Like South Sea islanders greeting a Yankee whaler, we welcomed them to our shores.

After a month I noticed that things were—not different, perhaps, but certainly not right. The Aliens were all over the TV, naturally, doing and saying colorful things. We weren't learning much about them, but they were learning a lot about us, especially our faults and foibles. They never had any suggestions on how to improve ourselves—they would never dream of upsetting the development of aboriginal cultures, they said—but they made plenty of disparaging comments, in the form of innocent questions. Had we ever thought about what would happen if we used those nuclear weapons we had developed? Our cults intrigued them, but why did we allow our shamans and priests to participate in serious political decisions?

The questions were not new, but hearing them from outsiders gave them a weight they had never had before. Our answers were neither new nor good, and they did not impress the Aliens, who made it clear that even by primitive standards we were fairly inept. The media echoed and amplified their re-

marks, until it seemed everyone was wondering if humanity was good for anything at all.

There were other things, worse things. One of *Scented Vine*'s crew, the doctor, had agreed to spend an afternoon with a team from the World Health Organization. It broke the appointment when, on the way into New York, it spotted an astrologer's shop. While the WHO scientists cooled their heels the Alien had its horoscope cast. The networks gave the proceedings full coverage, and interviewed a variety of soothsayers on the technical problems of tailoring astrology to fit an Alien's birth. Someone with a pseudo-Gypsy name was blathering about planetary influences and the Zodiac when the Alien emerged from the shop. It announced its satisfaction with our sophisticated magic.

What happened next *was* news. A TV preacher came roaring out of the crowd, shouting about blasphemy and iniquity, vowing to smite the Beast. That was when we learned about the zapper. The preacher and a half-dozen sight-seers went down in convulsions, overcome by perfect bliss. One camera showed the televangelist's face as he dropped. For the first time in memory his fixed, money-making smile looked genuine. The next day he preached a brief, disjointed sermon on the Nirvana of the zapper.

It didn't take long for the chaser movement to begin. Within a month tens of thousands of people around the world were looking for the Aliens; when the creatures showed up the chasers would provoke the Aliens into zapping them. To the Aliens it was just another picturesque native activity, one they indulged without interest or sympathy.

More than American society was falling apart. Russia, Red China, Japan, Western Europe, India—no country could keep them out; they landed their shuttlecrafts where they pleased, and everywhere the Aliens turned up they created problems. Things became especially bad in the Soviet Union. Maybe the Soviets thought we were behind their troubles, or maybe they thought we had made a deal with the Aliens. All I know is that five months after the first Alien landing the president ordered a creeping mobilization of American forces. I was a reservist and I was called up, which took me away from home at the height of the Collapse.

I doubt that the full history of World War Three will ever be known. All I saw of it came one midnight in Kansas. I'd been in the Fort Riley Officer's Club, watching the "Tonight" show. The guest host began one of the stock routines, the one about the Native Chief and the Drunken Sailor, at which point I walked out. The audience knew who the characters symbolized, but I couldn't laugh with them. I went outside to smoke a cigarette.

The Soviets must have fired first. I saw the meteor trails of the warheads and rockets as they came in from the north, heading for our missile silos. SAC was on the ball that night, and I saw a pair of our MX missiles take off. Then warheads and missiles began exploding. Somewhere high over the Atlantic, *Scented Vine* was having target practice.

The next day the Aliens apologized for interfering with our tribal dispute,

and explained that our fight would have endangered the Aliens among us. I don't know how many people heard their broadcast; things had become hectic, and panic evacuations and riots were running everywhere. The government's authority crumbled overnight. The close call with Armageddon had been bad enough, but the Aliens' casual intervention left the government looking ridiculous, like a naughty boy who'd just had his slingshot confiscated by his mommy. The federal government disintegrated within days. The Soviets held out for a full week before falling themselves. I suppose some governments survived a bit longer, until the growing chaos overwhelmed them.

I understood how those South Pacific natives felt, when their women became disease-ridden whores, and their men turned into alcoholics, and strange gods replaced their old faiths. Like them, we'd been helpless in the face of a superior culture. The fact that we'd seen it coming only made it worse.

For a while I thought that my wife and child were all right. After all, no A-bombs had gone off anywhere. Even when I heard about the widespread food riots, the raiders and vigilantes, I assumed that Marcia and our baby would pull through. It wasn't until my infantry unit disbanded and I went home that I learned otherwise. I don't want to remember that.

I saw the group of Aliens shortly after that, playing with a group of chasers. One of the Aliens had a zapper, while the others carried human rifles. They took turns, zapping and shooting their prey at random. The chasers didn't seem to care; their addiction was that powerful. I don't want to remember that, either.

I drifted for a while—and then I found the colonel.

"I expect them to land near us," Colonel Washington said the next day. His voice, normally as flat as stale water, had an odd animation in it now. Eagerness for battle, perhaps, although I couldn't say. I've worked with the Colonel since before the foundation of the Republic, and I know next to nothing about him . . . aside from the fact that he gives the impression it is best to know nothing of him.

Gwen, the speaker and I were the only ones in the room with him as the Colonel described the situation. "We have electric power, lights, and a radio service—and no reason to think that anyone else on Earth has our level of technology."

"We haven't picked up any radio signals," I agreed. Our radio service exists to serve the Republic's communication needs, but ever since it started, our techs have tried to contact other people out there. Being the only enclave of civilization in a darkening world is a lonely feeling. Hearing from other people would have been as welcome a morale boost as anything I can name.

"We can assume that the Aliens have already detected *our* signals," the Colonel said. "They must make an excellent beacon. Unless they land at random, they will want to investigate them. And us."

Speaker Ryan sighed. "In that case, we should plan for the worst. Colonel, can we repel an Alien landing?"

"I see no choice."

She looked impatient. "That doesn't answer my question."

The Colonel shrugged. "I have no idea of how this Alien ship is armed, or why it is here. The *Scented Vine* was a cargo ship; its crew carried only light hand weapons. We had no defense against them."

"We had you, Colonel," I said.

I wondered what the look on his face meant. "I believe my final assault surprised the Aliens. I cannot know. The worst case I can imagine is that this ship is a punitive expedition, here to punish us for fighting *Scented Vine*'s crew. They could be heavily armed."

"In which case, we fight," the speaker said. "You're correct, Colonel, we have no choice about that. The question is, what will we do if they show up and *don't* attack? That could be just as dangerous."

"No!" Gwen smacked a hand on the conference table. "This isn't 1997. We won't collapse the way the old world did when those monsters showed up—we *can't*. Madam Speaker, if they attack, we fight. If they decide to play tourist again, we tell them to screw themselves."

" 'Indulge in self-impregnation,' " the Colonel said. "Their translating machines didn't handle idioms very well."

"Whatever," Gwen said. "There's no danger of a repeat of 1997, so we've no cause to worry about it. The war with Weyler is our real problem. Now—"

A courier interrupted her. The young man came in, gave the Speaker a note and left. "Weyler's shown up at Coalville," she said.

I felt alarmed; Coalville supplies most of our energy. Gwen looked equally alarmed; if Weyler's men had done any serious damage there, then we had just lost more than a war. "What's the situation?" Washington asked.

"They came under a white flag," Ryan said. "Weyler, a small bodyguard, and some of his flunkies. He'll be here in a couple of days. He wants to negotiate a settlement."

"He can negotiate an unconditional surrender," Gwen said promptly.

"He won't do that," Washington said.

Gwen shrugged. "Then let's shoot the bastard, and let his successor surrender. Madam Speaker—"

"Cut it out, Gwen."

"Kate, we cannot afford to negotiate with Weyler." She jabbed the tabletop with a finger. "It's exactly what he wants: to be seen dealing with us as an equal. That'll give him a lot of prestige with the other warlords."

"We've negotiated with his kind before," I said.

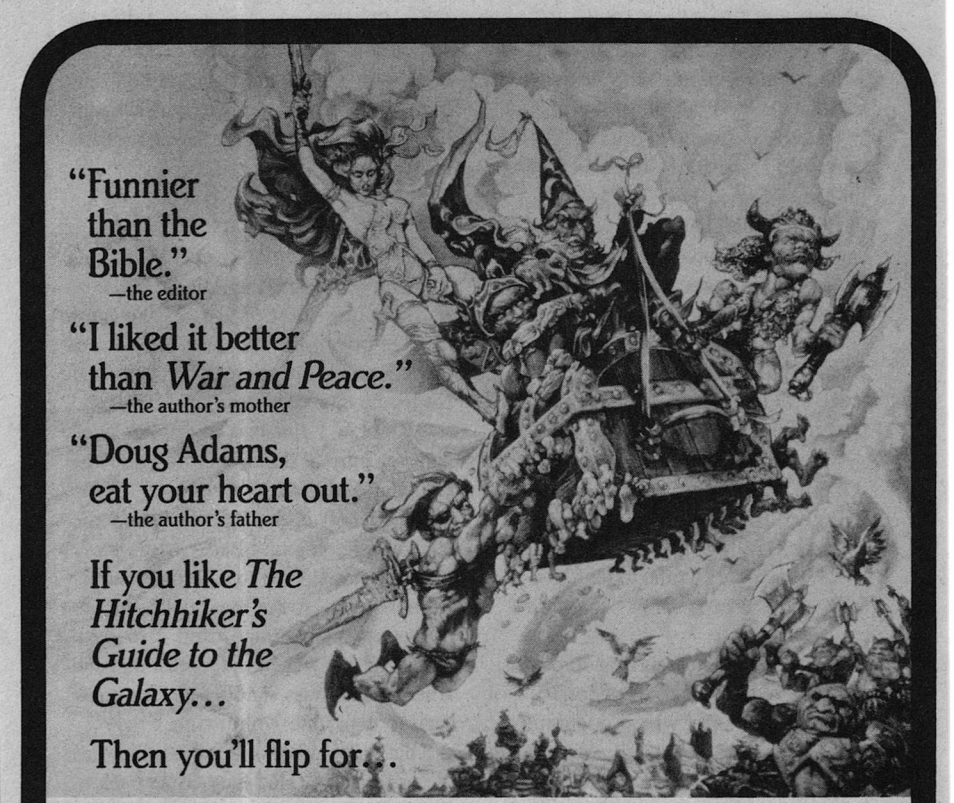
"But we've always called the shots," Gwen said. "We've *forced* them to negotiate, and to give up everything we wanted. We've always used 'peace talks' to emphasize our supremacy. Let's not forget that."

"No one has forgotten," Washington said.

"Good." Gwen looked at him. "Colonel, what's the best course of action?"

Don't ask me what he thought before he answered. "The best course of action is for me to follow the orders I receive. If—"

The last time any of us had heard that noise had been when the last Alien shut-




# THE LIGHT FANTASTIC
## By TERRY PRATCHETT

In Discworld, magic is commonplace, luggage walks upon tiny feet, dragons soar the skies, and you really *can* fall off the edge of the world. Rincewind, a bumbling and cowardly wizard, wanders too close to the world's rim and finds himself teetering. Far from being the end of his adventures, the real excitement has just begun as Rincewind, the most unlikely savior you'll ever meet, has to work the One Great Spell if Discworld is to be saved from impending doom.

"Pratchett is the Douglas Adams of fantasy."
—*Knave*

$3.50

**SIGNET FANTASY**

tlecraft had lifted from Earth. It was a low, insistent throb, and it made the windowpanes vibrate. It got louder for a moment, then cut off abruptly.

Kate Ryan got up and looked out the window. "There's a force-field dome on top of Signal Hill."

Gwen joined her at the window. She spoke with the aplomb that had placed her in charge of the Expansionist Party. "Ah. So there is. Now, what are we going to do about Weyler?" That "we" wasn't presumption on Gwen's part; "we" were now a *de facto* coalition government.

Ryan turned away from the window. "We'll wait for Weyler to arrive. That will give us time to plan." She sighed. "I hope."

"We don't need time to plan," Gwen said. "We already know what to do."

I was at home, having breakfast, when Weyler's entourage arrived. I thanked the courier who brought me the note, closed the door and went back to the table. "Is it bad news?" Janie asked.

"Weyler's here." I put the note away and went back to eating.

"There's nothing about *them?*" Michael asked.

"No, the Aliens are still inside their bubble. Pass the salt?"

"Does anyone know when they'll come out?" Janie asked. "There's a lot of uncertainty, Tad. The Exchange was a madhouse yesterday. Wheat and corn prices have gone up twenty percent since they landed."

"The Aliens haven't announced any plans," I told her. After twenty-two years, I've learned not to soft-soap my wife. She can pin me down with the same ruthless ease she uses on the trading floor. "Colonel Washington has brought in two platoons to watch them, but they're going to give Weyler's tribe most of their attention."

She nodded. "Is the colonel staying in town?"

"For the duration, sweets."

"Can he handle the Aliens?"

"Ma, he's the *Colonel*." Like most teenage boys, our youngest child has a tendency toward hero-worship. "Of course he can take them again!"

"Right." I finished my apple juice and got up. "I should get down to the Concourse now."

Signal Hill is the highest hill in the Capital City region. Back in the early days, you could see the entire Republic from its peak, so we mounted some heliographs up there and used it to flash messages everywhere. Now that damned Alien bubble was sending its own message to everyone within sight.

That sight depressed me as much as the uncertainty. Had they come back to finish the job the *Scented Vine* had begun? Back in 1997 the Aliens had destroyed Terran civilization with the deftness of a karate expert splitting a log. For all anyone knew, they derived artistic satisfaction from wrecking alien cultures. There was no telling what to expect.

The uncertainty was a killer for me. I'd lost everything in the Collapse, and so had Janie. Only the birth of the Republic, and the plans to restore civilization, had given us the confidence to start new lives. Things could never be the same, but we believed they would get better again.

Now it was 2024, we had our first grandchild, and what in hell could we expect next?

I was halfway to the Concourse when I saw Washington. I hurried to catch up with him; he has a quick, marching walk which discourages company. "I've arranged a campground for the savages on the north slope of Signal Hill," he told me. "If they make trouble, we can contain them with one platoon."

"And the Aliens?" I puffed.

"We now have three platoons nearby, plus a mortar team and four aircraft. That's all we can spare."

"How are things in the Neutral Zone?"

"Tense, Mr. Secretary. My scouts report that all of the local warlords are mobilizing. They expect the Aliens to destroy us and allow them to move in."

"Then they're in for a disappointment." Gwen Parsons joined us. "Colonel, could you slow down, please?"

"Certainly, ma'am." He slowed and I caught my breath.

"Thanks. We shouldn't let Weyler think we're in a hurry to see him."

A good point, that. "Are you ready to slit his throat?" I asked.

"That would backfire," the Colonel said. "Before Weyler left home, his shamans made a few convenient prophecies. If he dies here, even from natural causes, we'll take the blame."

"And he'll become a martyr?" Gwen sighed in resignation. "Oh, well."

The Colonel had given the savages a good place for a bivouac—good for us, that is. The ground was flat, with rises on all sides, and he had stationed a squad at each corner of a square. If the savages acted up, they'd die in the crossfire.

I had to wonder if Weyler wanted that. I'll never know if the man was insane or sincere, but he gave every sign of believing his paganisms. If he died here, he might become the kind of symbol that could unite the other outlanders against us in war. We could handle them one at a time, but not *en masse*.

The Colonel, Gwen and I walked into Weyler's camp, under the eyes of our sentries. First and foremost, the camp stank. Sanitation was something Weyler's people had forgotten. They'd pitched a few lean-tos, to house their leader and his counselors. It looked like the dozen warriors who'd escorted them would sleep out in the open.

Outlanders. They were all male, of course. They wore uncured animal hides and warpaint, but the thing that got my attention was their necklaces. Each one was made of human finger bones, taken from killed enemies, supposedly as a magical way of retaining the enemy's strength.

Gwen seemed unmoved by that sight, or by the variety of knives, spears and arrows the warriors carried. She glanced at all of them, then gave one a frankly female look that said *you might not be too bad in the hay, if we got you cleaned up*. Bless her for that; her look disconcerted them more than anything I could have said.

Weyler crawled out of his lean-to and approached us. I was surprised to see how old he was—about sixty, I'd say. Few outlanders live beyond their late twenties; even in the Republic, where we have plenty of food and some medicines, sixty years is quite an age—I

should know; I'm pushing it myself. He looked ascetic rather than scrawny, with whipcord muscles under the tan and dirt. His eyes gleamed as he paused to look at the force field. No doubt their arrival was a new factor in his plans, but not one that would upset them.

He looked at us with contempt. "The weaklings of the New Renaissance. The people who would rebuild the old world and repeat its blunders. We have come to talk to your ruler."

"She's busy judging a beauty pageant," Gwen said. "You're a bit late to enter, but we can hold a spot for you and your chorus line in next year's contest."

The warriors shifted around uneasily. None of them looked old enough to remember chorus lines and beauty pageants, but they couldn't miss her mockery, and they weren't used to this treatment.

Only Weyler maintained any dignity. "We will wait. We have far more time than you." He turned and looked at the force field bubble. "The Dark Gods have numbered your days." He looked to Washington and spoke before Gwen could respond. "And is the beloved hero ready to fight them again?"

"I am," Washington said.

Weyler smiled cynically. "Will it matter to you if you win or lose? No, let it pass." Abruptly he returned to his lean-to.

We walked away, but I waited until we were out of earshot before speaking. "Were you trying to provoke him?" I asked Gwen.

"No," she said. "The absurdity got to me. Weyler's a grown man! He taught college before the Collapse. Now he talks like he believes that 'Dark Gods' granola, and he acts if he has generations of tradition behind his noble-savage act.

"He might believe it," I said. "A lot of people cracked up during the Collapse."

"Fine. How are we supposed to negotiate with a lunatic?"

The Colonel chuckled. I'd always wondered what that would sound like, but the noise was much drier than I could have expected. "That was a common diplomatic problem even before the Collapse."

Gwen looked annoyed. "If he's really nuts, then that's all the more reason to blow him away—discreetly, of course. The sooner we free his 'tribe' from him, the better."

"We cannot simply liberate his people," the Colonel said, as we walked into his company base—a fancy name for a brace of tents, I'll admit. "If we try to bring them into the Republic, they will not cooperate."

"Colonel, they're savages," Gwen said. "Look at Weyler's men. If we gave them half a chance, they'd join us in half a second."

Washington shook his head. "My agents have tried to get them to defect. It hasn't worked because they're no longer 'nothing but savages.' Weyler has very carefully, and very thoroughly, indoctrinated his people with a new set of beliefs."

Gwen made a noise of disgust. "They *believe* that simpleminded trash about Dark Gods and magic?"

"They do," Washington said. "The mind that thought it up is anything but simple. He, Weyler, has created a my-

# The Awful Green Things from Outer Space™


Now, Steve Jackson Games brings back one of the *strangest,* and most entertaining, sci-fi games of all time — in a bright green Pocket Box!

***The Awful Green Things from Outer Space*** is a game of alien invasion. The exploration ship *Znutar* is attacked by monsters . . . and suddenly its crew are fighting for their lives.

One player takes the part of the Awful Green Things, trying to eat the crew and take over the ship. The other player controls the ship's crew, desperately trying one weapon after another to find the one that will work.

The Awful Green Things have invaded your local hobby store. Or, if you can't find them there, send $7.50 (includes shipping/handling) to order by mail. Texas residents add 60¢ sales tax. Send a long SASE for a free catalog.

**STEVE JACKSON** GAMES
Box 18957-J Austin, TX 78760

thology in which science is magic—a very weak magic. The Dark Gods destroyed the old civilization by appearing in the guise of a super-scientific race from the stars, and destroying us with stronger magic."

I shook my head. I didn't doubt the colonel—understanding the outlanders was a big part of his job—but that was hard to swallow. "Colonel, a lot of Weyler's people were born long before the Collapse. How can they swallow that mulch? They know what science is."

"Do they know?" he asked. "Did they ever know?"

Another good point. Hell, even before the Collapse a lot of people thought of science as a kind of magic. I had no cause to act surprised if Weyler's savages were more open about it.

"There is another point," Washington said. "Weyler uses ritual to condition his people into the viewpoint of savages. He encourages slavery and vendettas to counteract the ideals of civilization. Human sacrifice is a prime example—when a victim is killed, the participants must either feel guilt over a murder, or see the act as a legitimate, even moral deed."

"So to live with their consciences, they have to become savages," I said. Gwen made a small noise; she shared my disgust.

"Indeed." Looking oddly unsettled, the Colonel excused himself and went into his tent. Gwen and I left the camp, heading back to the Concourse. "You met the Colonel in '97," Gwen said. "How well do you know him?"

"How well does anyone know him?" I asked. "He went to West Point, and he fought in Central America for a year—he was wounded and spent some time in Walter Reed. He's one of the Founders. Beyond that, I don't even know his first name. He keeps to himself. Why do you ask?"

"Remember what Weyler said back there? About whether it would matter if the Colonel won or lost to the Aliens? What in hell did that mean?"

"You've got me," I said. "I suppose he was just trying to confuse the issue." Gwen nodded ruefully, said goodbye and went her own way.

I'm a better politician than she is; she hadn't realized I was lying. I know Washington a little better than anyone else; I know his secret. An Alien zapped him during the Battle of Chicago.

The Battle, in which we threw the Aliens back into space, was as lopsided as the devil. On our side, we had a scratch regiment from the Eighty-second Airborne Division, supported by National Guard tanks and artillery, and reservists such as myself. The Aliens had their landing craft, their force-shield and anti-meteor weapon—and one zapper.

The force field deflected most of our small-weapons fire, while the meteor ray vaporized our bombs and shells as they came in. The shield had effectively unlimited power, and once we ran out of bombs and shells, our soldiers had to go in on foot, pitting M-16s against a zapper. No wonder most of them mutinied.

The zapper is a gentle weapon, which works by stimulating the pleasure center of a brain—any brain, Alien, human or animal. On the one hand, as one of the Aliens explained, their race considered

it barbaric to kill or injure other lifeforms, no matter how primitive. On the other hand, a blast of pure pleasure can immobilize an attacker as effectively as death; no one can function during the ultimate orgasm. On the other hand (the Aliens have three), they had no idea that humans could become addicted to the zapper.

Everyone learned about that quickly. The zapper left its victims unconscious, to awake with the memory of ecstasy corroding their souls. All that the victims could think about was repeating the experience. Most chasers died of thirst, because drinking water distracted them from the pursuit of the Aliens.

The Colonel wasn't immune to its effects. At the climax of the Battle I saw him walk toward the Alien lander, when everyone else was either running or hiding. I was hiding behind a pile of concrete, and hoping that the zapper couldn't work through it. It was all I could do to peek over the rubble, and see the Colonel fall in convulsions as he was zapped.

I saw him get up and stagger toward the Alien with the zapper. I *know* he was hit again; I heard the zapper's burring noise, and I felt the pleasant sensation of its backlash. Before the monster could fire a third time, he was on top of it. The Colonel grabbed the Alien and slammed it against the pavement, killing it and wrecking the zapper. We'll never know how the other Aliens felt about that; they bugged out then. We saw *Scented Vine*'s drive flame pushing it out of Earth orbit that night.

Maybe Washington's ability to withstand the zapper isn't surprising. His will power is fierce; he held his unit together throughout the Collapse. Lesser men did the same thing, and went on to become petty warlords; the Colonel turned his force into a servant of the Republic and civilization.

Did the experience change the Colonel? I couldn't say. Even before the Battle I had found his mythic-warrior reserve impenetrable. One thing was certain: I couldn't mention any of this to Gwen. Aside from being an intolerable breach of the Colonel's privacy, it would demoralize her, and everyone else, to learn that our national hero was a victim of the zapper.

It didn't do anything for my morale to know that—or to realize that Weyler knew it.

The Aliens came out of their lander that afternoon. They wore suits identical to those of *Scented Vine*'s crew. The garments were said to be puncture-proof, which would prevent the spread of any micro-organisms in either direction. They had a mirror-like anti-laser coating that made it difficult to look at them. Three of them stood inside the haze of the force field, while one moved downhill toward the Concourse and the Forum. Soldiers and outlanders watched it silently, while the Colonel, Gwen and I went out to speak to it.

I was there more through curiosity than necessity. The Colonel could assess their military potentials better than I could, and the only real plan the government had was to stall for time. Still, I was interested in the things.

Come, let us be honest. I wanted to see how Colonel Washington reacted. If he was hooked on the zapper, I wanted to know now.

The Alien recognized us as a delegation. It stopped in front of us and touched its translator plate. "I wish to visit your leader." The machine sounded as emotionless as the colonel.

"She's taking the day off," Gwen said.

"My business with her is most urgent."

Gwen shrugged. "If she thought she had urgent business with you, she'd have shown up for work today."

"I wish to discuss the affair of the *Scented Vine*. I am convinced your leader finds this important."

I glanced at the Colonel. His face looked as blank as the Alien's gold visor. He'd noticed the zapper in its holster, along with other devices on the Alien's waistband, but it didn't hold his attention. At least, that's the way it seemed to me.

"Our leader has other things on her mind," Gwen said. "If you want to make an appointment, I think she can work you into her schedule sometime next week."

There was a long pause, and I wondered what was going on inside that helmet. "I will agree to an appointment," the Alien said at last.

"Fine. Speaker Ryan will see you Monday at noon."

"That is acceptable." The Alien spun around and went back to its lander. It walked gracefully, I'll admit; the three legs and three arms moved with a dance-like rhythm.

"Interesting," the colonel said, as we walked back downhill. "It seemed almost desperate to see the Speaker."

" 'Almost,' nothing," I said. "I'd say it *was* desperate. Not to mention diplomatic."

"It wasn't diplomatic," Gwen said. "Patient, maybe. *Stinking Weed*'s crew never accepted any sort of a delay, remember? That thing tolerated an unavoidable delay, nothing more. I wonder why?"

"It is not here to help us," Washington said. "If it was here to help undo the damage of their last visit, it would have said so."

"So they want something from us," I concluded. As conclusions went, that stank. What did we have that could interest the Aliens? Judging by the looks on their faces, Gwen and the Colonel were as much in the dark as I was.

"I see that the Dark God confounded you," Weyler said. He'd crept up behind us, as quiet as a cat but less welcome.

"Not at all," Gwen said. "It just made an appointment to see Speaker Ryan next week. You should do the same thing, Weyler, although I doubt she'll invite *you* to lunch."

His eyes glinted angrily. "So it confounded you after all."

"It almost sold us the Brooklyn Bridge," Gwen said cheerfully. "Weyler, why don't you walk up to one of those ugly bastards and tell it about your 'Dark Gods' silliness? Or get some of your clowns to pray to them—up close, where they can smell you?"

"The Dark Gods are not mocked!" he said, and stalked away.

Washington's eyes followed him. "I'd better speak to my men," he said. "They have orders to watch him at all times."

"Don't be too hard on them," Gwen

said. "Weyler lives like an animal. He knows how to slither around."

"And my men are supposed to know how to follow him." The Colonel left.

I looked Gwen over as we walked down the Concourse. "Gwen, have you got something personal against Weyler?"

"You mean, why am I acting this way?" She shook her head. "Tad, I lost my husband and children to raiders. Maybe I wouldn't hate Weyler so much if he was just a savage, but he's deliberately working to tear apart what's left of civilization. He's no better than the Aliens."

"Is that any reason to bait him?" I asked. "Or them? If you can't be hypocritical enough—"

"I could," she said, and frowned thoughtfully. "But I won't. Treating them seriously is a mistake; it gives them credibility. I think we would have been all right if we'd laughed at those walking milk stools in '97. Don't ask me why we didn't. Well, we both have work waiting for us. Catch you later."

She left me alone with my thoughts. Gwen might provoke either the Aliens or Weyler into doing something dangerous, but politically she was making the right move. If the Republic survived both the Aliens and Weyler's plans, she'd come up smelling like a rose. If we collapsed, well, nothing would matter any more.

I went back to my office. Between Zone Twenty-nine and my War Department work, I had plenty to do. Mobilization was on my mind; if we were going to have a war, I wanted it done as efficiently as possible. There were reports of more incidents in the Neutral Zone; bands of raiders were probing everywhere, no doubt at Weyler's behest. They couldn't hurt us, but they tied down a considerable fraction of the Army.

One thing became obvious: mobilization was going to delay the Mesabi project. For the past twenty-seven years, all of our metals have come from salvage. Old cars, old plumbing, old wiring—there was plenty of scrap left after the Collapse, and so far it had met our needs. However, our industry was growing exponentially now, and we needed other sources. That meant reopening the iron mines in the Mesabi ranges, in upper Minnesota. Almost worked out in the last century, they still held enough ore to last us for decades.

That project was going on hold, I decided. The Mesabis were way outside our territory, and the expedition would have required at least a battalion of infantry for proper security—two battalions, once full-scale mining got under way. The Republic had a toehold on Lake Michigan, so we could reach the Mesabis without going overland, but the people up there were hostile to outsiders. We'd lost half our scouts to them.

We couldn't spare any soldiers now, which was a blow to our overall reconstruction plans. There would be repercussions; industry would suffer, employment would drop, farm outputs would decrease—hell. We'd muddle through, the way we always have, but I wouldn't like it.

You can understand why I was in a bad mood when the Alien waltzed into my office. My secretary was out to lunch, so the first warning I had came

when I heard the thing's splayed feet tapping on the floor. It wasn't the one I'd met on the Concourse; the tool belt was different, and the zapper was holstered differently. "Have a seat," I said maliciously. "I'll be with you in a moment."

"Misunderstanding," its translator said. "Anatomy is not compatible with human seating. Regrets at declining implied hospitality. Name, Dzhaz."

"Name, Woodman." Odd. No Alien had ever given its name to a mere human before. While it stood in front of my desk, I picked up a letter and started reading it. The note came from Pete Bodo, who told me that he'd found his cat-killer. A twelve-year-old boy on a neighboring farm was now supplying Bodo with a month of free labor. He thanked me for talking to the salesman who recalled selling the shotgun shells to one of his neighbors. Case closed.

I put the letter down and stared at my visitor. I had the feeling that the thing was uncomfortable. Perhaps I was just projecting human body language onto the Alien, but it kept shifting around in an interminable string of small movements. Fidgeting? Perhaps. "Now, what can I do for you?"

"Assignment, to observe routine of perceived leader or semi-leader. Correct status, request made with ritual polite-words?"

I think it was trying to say "please," certainly another first for an Alien. "I'm a member of the Legislature," I said. "I share the leadership with a large number of people."

" 'Legislature,' " Dzhaz repeated, as if taking a note. "Implies democratic or republican governing system. Permission, observe daily routine?"

"Why not?" I said. A soldier appeared in the door behind it, and I made a quick, casual gesture: everything's fine. I hoped it was. If that Alien really was nervous, it might reach for its zapper and cut loose.

It waited a moment before answering. Maybe the Aliens have trouble understanding that a question can be an answer. Finally Dzhaz touched the letter from Bodo. "Request, nature of document?"

"It's the conclusion of an important criminal matter," I said. "A farmer had two cats killed by a naughty child. I helped find the miscreant."

"This rates as important?"

I mulled that over. I'd meant to bamboozle the monster, but now that I thought of it—"Yes, I'd say so."

The Alien took one of the doohickeys from its belt and held it in front of its visor. "Statement of fact," Dzhaz said. "Statement of fact." I saw subdued lights race across part of the object, and I decided it was a lie detector.

Well, even Aliens have a right to be puzzled when a politician tells the truth. It dawned on me then that I was going to play everything straight with the monster. *Scented Vine*'s crew had treated humanity like a bunch of savages—devious, shifty, untrustworthy. No doubt this thing had the same attitude, in which case a little candor might trip it up.

"Request, explanation of importance?"

"Well . . . aside from a cat's value as a ratter, there's the nature of the crime." I held up the letter, and a quick

blip of light told me the Alien had recorded it. "A child enjoyed taking a gun and killing animals. Now he's being punished—"

"Request, brutalizing child is acceptable act?"

"*Disciplining* a child is acceptable," I said. "The boy might have decided that killing people is fun, too. Aside from paying for the damage he's done, he's also learning not to do things like that."

It fiddled with one of its instruments, a thing that looked like frozen quicksilver. "Request, importance of this to you?"

"I represent Bodo in the Legislature—" I stopped, feeling that didn't cover everything. "I represent society as well. The child wasn't fully responsible for his acts, so it was up to society—myself, Bodo, the boy's family—to intervene."

"Request, explain why society must intervene?"

I wondered if it had a point to its questions. "No society can tolerate members who work against the society's best interests—"

"Request, attitude includes dissent?"

"Dissent is generally in society's interest," I said. That was a damned peculiar question; didn't the Alien understand the difference between dissent and disorder? "How reliable is your translator?"

Dzhaz touched its three hands together. "Uncertain. Use is made of records purchased from *Scented Vine* crew. Reliability perhaps not total, but adequate. Request, dissent is considered beneficial?"

"It's a good way of catching mistakes before they get out of control. Was that a serious question?" It sounded like something that might have been asked in the Kremlin, or the Nixon White House. I wouldn't have expected it from a star-traveler, no matter how non-human it was.

"All requests made for information."

"That's what the *Stinking Weed*'s crew told us," Gwen said, striding into my office. The look on her face was murderous.

The golden visor turned to her. "Name of earlier ship, *Scented Vine*."

"A rose by any other name," Gwen said, seating herself. "What in hell do you want here, monster?"

"Information, related to social degeneration, this planet."

"What's it to you?" she asked coolly.

"We are academicians. Topic of social collapse rates primary attention in many portions of culture. Hence, information sought."

"Why?" Gwen's face darkened. "So you can write a thesis? Title, *How it Feels to Have Bug-Eyed Monsters Bugger Your World*?"

I made a quick gesture, motioning for silence. The Alien's fidgeting had increased, and now I was certain it was a case of nerves. Gwen's hostility was plain, and I didn't doubt that the Alien's instruments could interpret human emotions for the creature. It might run amok with its zapper—or just stop talking. In either case, I wouldn't learn why it was here. "You didn't come all this way just to learn why we fell."

"Incorrect. As stated, object is to study social collapse."

"You're too late to study anything," Gwen told Dzhaz. "The damage was

# FINANCIAL ADVICE NEVER LOOKED SO GOOD.

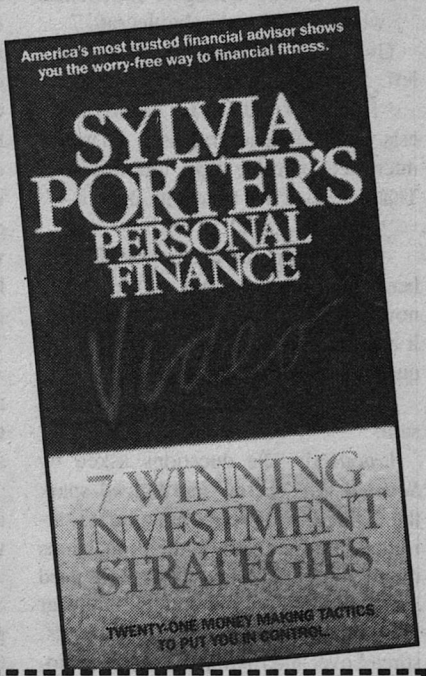
Even the best advice can sometimes be confusing. But with Sylvia Porter's Personal Finance Videos, powerful, moneymaking concepts come alive, forming simple, clear pictures in your mind.

In 7 WINNING INVESTMENT STRATEGIES, you see charts, graphs, and practical, everyday examples that show how you can profit from:

- home ownership
- real estate
- tax-advantaged investments
- when to buy or sell stocks
- higher income investments
- investing for growth and appreciation
- mutual funds

You'll discover sensible investments geared to your lifestyle, your family commitments, and your personal finance objectives. What's more, you'll see absolutely what *not* to do with your money.

So don't let another day pass. Use 7 WINNING INVESTMENT STRATEGIES to brighten your financial outlook.




## ONLY $29.95

**CALL TOLL-FREE TODAY**
**1 (800) 453-9200**
Or use coupon



Make check/money order payable to J2 COMMUNICATIONS and send to:
**SYLVIA PORTER VIDEO · P.O. Box 3169 · Ogden, UT 84409**

Yes! Please send me _____ SYLVIA PORTER'S PERSONAL FINANCE VIDEO(s) for $29.95 each (plus $3.00 shipping/handling per tape).

☐ VHS ☐ Beta

Method of Payment: ☐ Visa ☐ MasterCard ☐ Check/Money Order

CREDIT CARD # |_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|

EXP. |_|_|_|_| SIGNATURE _____

Name _____ (Please Print)

Address _____

City _____ State _____ Zip _____

SFA

done before the *Stinking Weed* left. They could give you the whole story."

"Incorrect. They could only describe their activities. Self-evident that they could not describe pre-arrival or post-departure events. *Scented Vine* crew merely—" The translator chopped off suddenly. I heard a faint grinding noise from inside its helmet. Alien speech? Probably it was talking to its friends. "I will now return to shuttlecraft."

Gwen shut the door behind it after it left. "Did you learn anything, Tad?"

"I'm sure I did." The Alien's interests were real headscratchers. "They're interested in more than the Collapse. That one wanted to watch me at work—"

"And you let it?"

"Was I supposed to stop it?" I asked her. "Gwen, we're not in the Forum now, so quit campaigning. I talked to it about Bodo's cats. It asked me some questions—basic, simple ones."

"That has a familiar ring," Gwen said.

I nodded. The questions asked by *Scented Vine*'s crew had helped spark the Collapse. There'd been a bored, arrogant indifference to their questions then, when they asked us why we used *such* primitive technology, or why our behavior was *so* barbaric. Such things, spread over international TV and radio, did little for the human race's pride. And yet—

"There was something different here," I told Gwen. "This one acted as if it was trying to get to the bottom of something. I think my answers puzzled it."

She didn't look pleased. "It may be trying a new approach to destroying us. Tad, I've always felt that *Scented Vine* trashed us on purpose, to destroy potential rivals to their species. These monsters must be here to check up on the job, and to tidy up loose ends."

"Such as the Republic." I caught myself drumming my fingers on my desk, something I do when I've got a tough problem on my mind. Gwen's theory fit the facts, but only if we were wrong about certain things. The Aliens could blast us back to the Stone Age, using their anti-meteor beam to destroy a few critical facilities. Despite their claims, *Scented Vine*'s crew had had no compunctions about killing. Certainly the Collapse had led to some five billion deaths over the past quarter century, as most of Earth sank back to the subsistence level, and certainly the Collapse was their doing. The blood was on their hands. Given that, why would our current visitors destroy us the hard way? The facts just didn't jibe.

There was a polite knock at the door, and Washington entered. "You wanted to see me now, Mr. Secretary," he said, standing at parade-rest.

"Yes, I wanted to go over the new mobilization plans." I nodded at the window, in the general direction of Signal Hill. "We're still following Plan Seven, but we never laid any contingency plans for *this*. How much more time will you need to prepare?"

"One week," he said. "The forces watching Weyler and the Aliens are our 'fire brigade'—our emergency reserve," he explained to Gwen. "It will take a week to mobilize their replacements."

"We can afford that week," Gwen said. "How long do you think we'll need to defeat Weyler?"

"I don't think it's possible," he said,

a statement that left Gwen looking as surprised as I felt. "The situation has changed."

"Because of the Aliens?" I asked.

"No, sir, the change preceded their arrival." He looked to Gwen. "Ma'am, I said that Weyler has indoctrinated his people."

"What's that got to do with anything?" she said. "They may believe his mumbo-jumbo now, but once we toss him out and send in our educators—"

"The same things were said about Vietnam and Nicaragua," Washington said. "The more I think about it, the more I'm convinced that the situation here is similar. Weyler has given his people a set of beliefs which explains the world; part of the explanation is that the Republic is a source of evil. An invasion will reinforce this belief."

"We'd defeat ourselves," I said. "Is that your point?"

"Not if our attack was impressive enough," Gwen said doggedly.

"Weyler knows enough to engage us in a guerrilla war," the colonel said. "I fought in one for a year, in Nicaragua. Even against Stone Age weapons, we would take heavy casualties." He paused, and I got the impression that he was debating something with himself. "We would end up killing many of the people we wish to help."

Gwen looked somber. "That's always the case, Colonel," she said. "We're out to help all of them, even the ones who fight us. It's a choice between prolonged savagery and brief bloodshed—"

"Unending bloodshed is now on the list," he said, surprising me. I've never known him to interrupt anyone. "In Nicaragua, we found ourselves battling a large part of the population. We never knew who was on our side and who was not. I rose from second lieutenant to colonel because the guerrillas concentrated on the officers—and many of them found it impossible to stay alert at every moment."

"But you survived," Gwen argued, "And with your experience, you could avoid the mistakes made down there—"

"My experience," the Colonel said. "For the most part, I learned how to avoid combat. Everyone who wanted to survive did that. It held down casualties, but it was no way to win a war. As for the action I did see . . ." His voice trailed off and an introspective look showed on his face.

He started speaking again, as impassively as ever. "On my last day in Nicaragua, I was in a troop truck with a dozen other men, on the way to the airport. The communists hated the idea of any Americans leaving their country alive, so they made a last-minute attack on us. When the truck stopped at an intersection, a guerrilla ran up behind us with a grenade—"

"Please stop," Gwen said suddenly.

The colonel ignored her. "I estimate he was ten years old. No doubt one of his parents gave him the grenade. That was common, because a large part of the population had been indoctrinated to fight at all costs. A military victory would have required genocide, you see, which would have been counterproductive."

"So that's when you were wounded," I said inanely.

"I was not wounded. I shot the guer-

rilla before he could throw the grenade. A medical officer learned about the incident when I returned stateside, and I was subjected to a psychiatric examination. I was confined to the psychiatric wing of Walter Reed for observation." His voice remained as matter-of-fact as ever. "It was the military's opinion that the things I did to survive were insane, even though I was following orders."

Gwen looked rattled. "But—but they decided you were all right eventually—"

"No, ma'am, I went AWOL from the hospital. I always felt my confinement was a mistake, being a decision made by people who had never been in combat and refused to understand the situation."

I felt my skin crawling. "So when you rejoined the Army—"

"The Collapse was well under way, Mr. Secretary. I knew no one could check on me, and there was a need for my skills." He checked his old wind-up watch. "I should return to my headquarters now."

"Okay." I nodded weakly and he left. My head was buzzing. This explained so much about the man, I thought. Small wonder that he had isolated himself from people. I couldn't imagine how he endured the loneliness that required.

"No wonder he keeps to himself," Gwen said quietly. "He couldn't afford to have anyone learn that—and neither can we."

"Is that all you can think about?" I asked. Granted, it would devastate everyone to learn that our national hero was a ruthless killer and an escaped lunatic, but the Colonel hadn't been speaking merely to unburden what was left of his conscience. "He was warning us not to start this war."

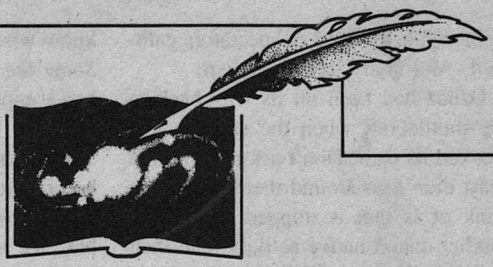
"I know. I just don't want to think about that right now." Gwen was slumping wearily in her chair, and for the first time I realized that she had as many gray hairs as I do. "It's times like this that I can't see why I went into politics."

"You and me both." I forced myself to consider our alternatives to the war. Attack was out, not if it would embroil us in a war we couldn't win . . . and produce more casualties like Washington. The hell of it was that we couldn't back down, which would demoralize our own people while encouraging more outlander attacks. Merely defending our borders wasn't enough, either. With our limited resources, it was either expand or die.

Facing our lack of options, it took me a moment to notice an odd rhythmic sound floating through my office window. The Aliens? I wondered, getting up. I couldn't see anything odd atop Signal Hill. The force field looked steady.

Gwen had noticed it, too. "That sounds like chanting," she said. "We'd better see if Weyler's up to something."

He was. We went down to the Concourse, where Weyler and half his men had arrayed themselves. Weyler himself sat cross-legged on the grass beside the boulevard, while his men formed a semicircle on the asphalt. They were chanting *ottar-idle, hai!, ottar-idle, hai!*, over and over at the top of their lungs, while shuffling their feet in an odd step, left, left, right, and swinging their spears in the air. Several of our soldiers were watching them, baffled by the



Algis Budrys on

# L. RON HUBBARD's WRITERS OF THE FUTURE

The Writers of The Future Contest has been extended to September 30, 1988. It's still growing.

WOTF has become a landmark feature of the SF (Speculative Fiction) scene. As founded and planned by L. Ron Hubbard, entry in the Contest is free. It's limited to new authors of science fiction or fantasy who have professionally published no more than three short stories or one novelette. Every three months, a panel of distinguished SF writers names the top three finishers for outright cash grants of $1000, $750 and $500, respectively.

The monetary prizes are delivered shortly after the winners are notified. They are also symbolized by elegant trophies or certificates. Those are presented at the annual Awards Celebration. The recipients are brought to that event as the guests of WOTF. At the Awards, one of the year's four quarterly First Prize winners is announced as recipient of the L. Ron Hubbard Gold Award to The Author of the Writers of The Future Story of The Year, with its impressive trophy and an outright cash grant of an additional $4,000.

Winners, and some finalists, are offered excellent rates by Bridge Publications, Inc., for use of their stories in Bridge's annual anthology. That's separate from the Contest, and means additional income for the authors, as well as the largest SF-anthology readership of all time.

As you could see by reading a copy of "L. Ron Hubbard Presents WRITERS OF THE FUTURE," Volumes I, II or III, the Contest favors no particular type of SF over any other. The books also include how-to-write essays by the Contest judges, as well as an article by L. Ron Hubbard on the practicalities of artistic expression. Each book contains a complete set of Contest rules. It's a useful volume.

Every story in the Contest has an equal chance. Manuscripts are circulated to the judges with the authors' names removed. As Co-ordinating Judge, I evaluate every manuscript, and pass the finalists on to the ultimate judges who determine the winners. The only way to win the money, the trophies, and all the subsequent benefits, is to write a good story, and then enter it. If you think you'd like to do that, or if you'd like a detailed rules sheet, or have any questions whatever, write to:

## L. Ron Hubbard's WRITERS OF THE FUTURE

P.O. Box 1630
Los Angeles, CA 90078

Please send a stamped self-addressed return envelope of the appropriate size with your manuscript or rules-request.

*— Algis Budrys*

sight, while a crowd of spectators gathered. And then I saw the Alien.

Dzhaz had been on its way back to the shuttlecraft when the savages had blocked its path. Don't ask me why the beast didn't go around them. All I can think of is that it stopped to observe another quaint native activity, and then found itself surrounded by a horde of humans, cutting it off from its friends.

As I approached Dzhaz I knew it was scared. Nothing we or the savages had could cut its suit, but the shiny garment wouldn't protect it from impacts or crushing. I wanted to defuse the situation before its nerve broke and it reached for its zapper.

The Colonel must have had the same idea. I saw him push through the crowd, approaching the monster from its other side. I was slightly ahead of him, and I got to the Alien while he was forcing his way between two spear carriers. Then Weyler shrieked out something and his men lunged with their spears.

The Alien went for its zapper and my mind went into overdrive. Hundreds of people had gathered here. A few indiscriminate shots would turn many of them into chasers. Old as I am, I was on top of the monster before it could take aim.

The first thing I remember is something sharp digging into my ribs as we fell over. I had landed on top of Dzhaz, and something on its tool belt was poking my side. It bucked and tried to heave me aside as I clutched its arm with both hands, trying to break its grip on the zapper.

I heard a frantic chittering inside its helmet, untranslated but a cry for help. A fainter scrabbling answered it, and I knew what it was saying. *The evil eye! Show the savage your face!* A silvery hand appeared and pushed the visor back.

It almost worked. I'd seen Alien faces before, but never like this, never as a writhing mass inside a clear plastic bubble. We rolled over and the Alien was on top of me, but I kept my grip. I could tell it wasn't as strong as a human; the arm inside the suit felt thin, almost skeletal. I held on with one hand and reached for the zapper with the other.

Two other hands clawed at mine. Without thinking I pulled one away. I saw the third one take the zapper. I had enough time to yell in horror as it took aim at me. A wave of pleasure roared through me, and I gloried in it even as it threw me into a convulsion. It faded, and in a last moment of sanity I knew the zapper had sunk its hooks in my soul. Then there was darkness and nightmares.

The Alien scientists wanted a new tool to destroy other worlds. They'd decided to improve the zapper, and they'd drafted me to help them. They had me trapped in the back of an old Army truck, and every so often they zapped me. They kept changing the settings on the weapon, so that it stimulated a different part of my brain. At each trial I felt loss, agony, misery, and painful new emotions that I hope will never earn names.

I woke up with the sour taste of vomit in my mouth. I was in my bed at home, naked under the blanket. I had a dim memory of my sphincters letting go, and another memory of Janie bathing me. I felt light-headed as I sat up.

"He's awake!" Janie came into the room and stopped just inside the door. "Tad? Are you all right?"

I croaked out something that sounded like yes. There was a pitcher of water on the nightstand. I rinsed out my mouth and tried again. "I'm fine. How long was I out?"

"S-since yesterday."

"Yesterday?" That had an unreal sound. I felt like I'd been out for days. This must have been harder on Janie, though. Her bloodshot eyes and puffy face meant she'd done a lot of crying.

I reached out and touched her face. She's almost my age, but I suddenly realized that she carries the years better than I do. Her face has character. Beauty. I was amazed to find that, after twenty-plus years of marriage, I could look at her face and still feel that I was seeing it for the first time.

I was hugging her and wishing I had the strength for a lot more when it hit me. "Janie. The zapper. It didn't get to me."

I felt her tense. She must have thought I was crazy. "Tad, Tad—"

"I know what happened," I said. "It hit me, but I don't want it again."

She pulled back and looked at me. "You mean that."

I nodded vigorously and my head swam. "It didn't hook me."

"Maybe it wasn't on full force." Janie was still afraid of what had happened to me. "Maybe it was broken."

"No, I caught the full thing." I laughed nervously. "It just wasn't that good."

"You were scared of it," she said, trying to convince herself that I was all right after all. "You've had decades to immunize yourself that way."

"Yes." I didn't believe it, though. There was nothing special about me. How had I resisted addiction? Washington had done it, but he—no, I cut off that line of thought. It wasn't fair to him to say he was crazy, and it ducked the issue as well.

Janie was drained, physically and emotionally. I doubt she'd slept at all last night. I put her to bed, then dressed and went into the kitchen for some food. Michael came out of his room. 'You all right, Dad?"

"Just hungry." I hugged him, hating that scared look on his face, hating the thought that I might have lost my family a second time. Was that what had saved me?

We had breakfast. I found that all the foods had strong, vivid flavors; the backlash of the zapper had sharpened my tastes—or maybe my close call with madness had done that. I ate day-old bread, dried fruits and apple juice, and I felt like a gourmet with each mouthful. I looked out the kitchen window and admired the sky, which was filling with rain clouds that I might otherwise have found depressing. I could smell the rain coming, along with a heavy petroleum odor from the chemical works. Amazing, the number of things you can find to appreciate.

I sent Michael off to school and started on a second course. Washington appeared at my front door as I was finishing up. "It's good to see you back in health, Mr. Secretary," he said. "There have been some developments since yesterday."

That was the Colonel, I thought, as

we went into the front room. Business as usual, no matter what. He sat down, although he held himself with parade-ground erectness. His eyes looked tired; it was obvious that Janie wasn't the only one to have spent a sleepless night. "Have the Aliens done anything?"

"They've withdrawn to their shuttle-craft. The speaker has told them that that may not carry zappers among us. They have made no reply yet."

"They'll accept," I said suddenly. "Count on it. They want something from us badly enough to do that."

"I agree. However, I don't think they'll leave their lander again until after Weyler and his group are gone. The Aliens feel menaced by them."

"Tell them to get in line with the rest of us." I looked at him. "Weyler arranged that attack."

"Obviously. I think he hoped to turn as many of our people as possible into chasers." He looked pleased. "Your actions made that impossible. By the time the Alien finished with you, the spectators had fled out of the zapper's range."

That gave me a good feeling, the sort you can't get from a zapper or anything else. "I think he wanted something else, Colonel. Weyler didn't signal for the attack until *after* you were inside his ring of warriors. The purpose must have been to have the Alien zap you. If you were incapacitated, or changed into a chaser, we'd lose our best soldier. It would blow morale to hell, too."

He nodded at the logic. "It fits with the remark he made the other day. Evidently Weyler knows I have been zapped before. I suppose you weren't the only witness at the Battle of Chicago. No matter. It is obvious that neither of us are addicted."

"No." I had a sudden qualm. What would I do the next time I saw an Alien with a zapper? I hoped I'd never have to find out. "What's Weyler done lately?"

"After the attack a runner arrived from his homeland. He sent a messenger back a while later. I've no idea what the message said."

"Ditto. Whatever it was, it'll take a couple of days for it to reach his home." I shook my head. "There's one bright spot to all of this. If the Aliens stay holed up while Weyler's around, we'll only have to face one problem at a time."

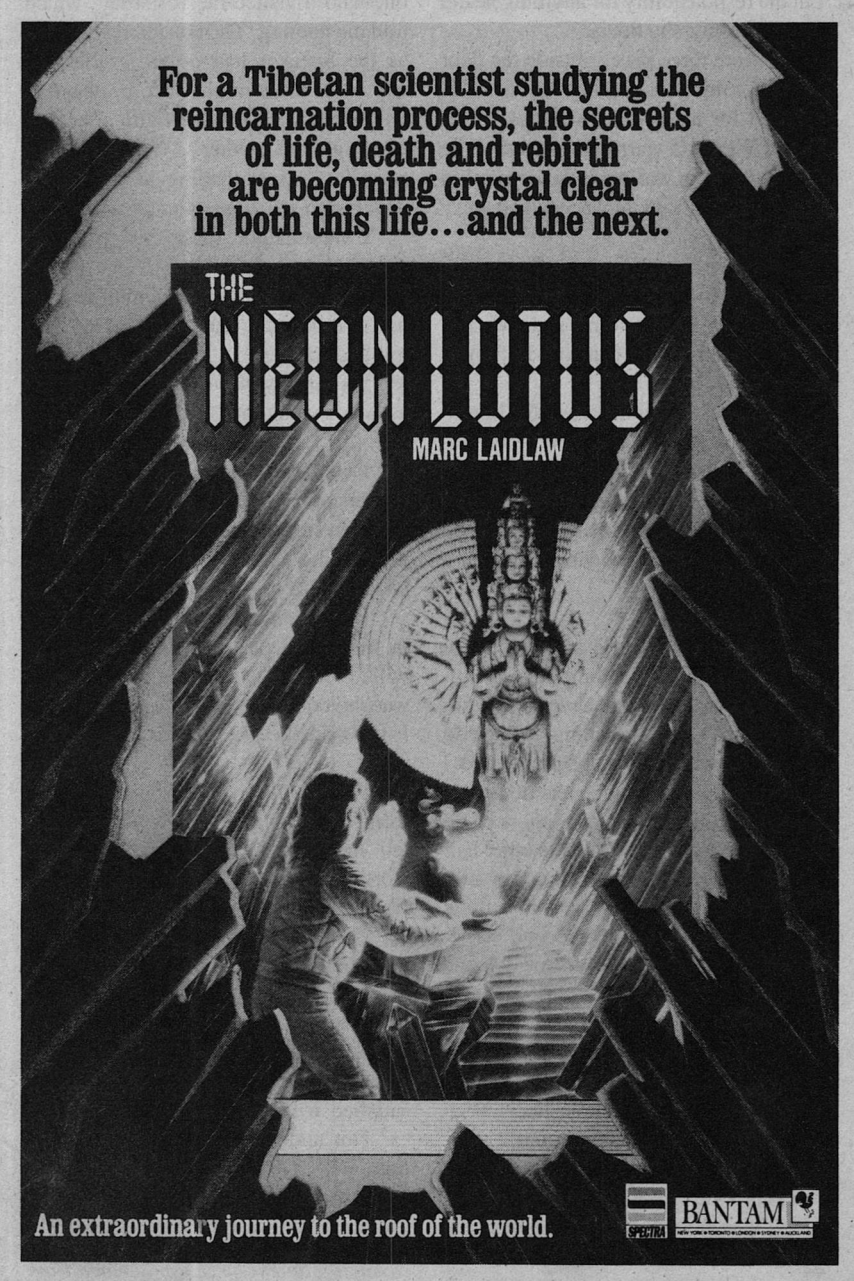
"Possibly," the Colonel said, "But I feel that we must deal with the Aliens before we can deal with Weyler. A session of the Legislature has been scheduled for tomorrow to discuss the matter."

"I hope I have something to say to them." I scratched my chin, feeling the stubble. "Colonel, can you think of any alternative to war?"

"No, sir, I can't—but then my job is war. I do not permit myself to become involved in the decision-making process, as you know."

That was as close to a rebuke as I'd ever heard from him. It also explained some things. Washington knew that he was mentally unbalanced, and he confined himself to activities where he would be harmless, or useful. He avoided areas where he didn't trust his judgment.

He thinks of himself as a weapon, I thought as we left my home. A tool. The only way he could cope with his past was by letting other people assume the responsibility for his actions. That


For a Tibetan scientist studying the reincarnation process, the secrets of life, death and rebirth are becoming crystal clear in both this life...and the next.
THE
NEON LOTUS
MARC LAIDLAW
An extraordinary journey to the roof of the world.
SPECTRA
BANTAM

put the responsibility for anything he did square on my shoulders.

We were three paces outside the door when Washington grabbed my arm. He reached for his pistol, then stopped as one of Weyler's warriors rose out of the shrubbery. The war-paint on his face hid his expression well, and he walked away in silence.

"They're too damned elusive for us," Washington said. "We can't confine them to their bivouac and we can't track each of them. That surely figures in Weyler's plans."

"It makes it damned easy for him to spy on us," I said. I wondered what this one had been looking for. Later it would occur to me that he had seen the obvious: the zapper had had no effect on me. That, too, would figure in Weyler's plans.

I met a lot of people as I walked to the government office building. A politician never complains about attention, but it didn't take too long for me to figure out what was happening, and I started judging people's reactions. I'd say half of them wanted to know if I'd turned into a chaser, while the other half took me as proof that the zapper wasn't as formidable as legend had it. I think Gwen was solidly in the second camp. She seemed happy to see me up and around, although we didn't get the chance to talk much.

The rain started around the time I entered my office. It built up rapidly, and it was coming down in sheets when the Alien walked into the room.

I looked it over carefully. Its silver suit was bone dry, which didn't impress me. It was wearing the same belt as the one who'd visited me yesterday, which told me nothing. The holster was empty, as the Speaker had ordered, although any of its tools might have been a disguised zapper. The idea didn't affect me one way or another. "What do you want?" I asked, hoping that it would understand my tone as unpleasant.

"Continuation, discussion of prior day."

Fine and dandy, I thought. It zaps me, and then it wants to talk as if nothing had happened. "Then you'd better tell me what you *want*," I demanded, as Gwen came into my office, dripping wet.

"Reiterate, information regarding social disintegration."

Gwen looked it over, satisfying herself that the beast was unarmed. "Aren't you afraid of the savages?" she taunted.

"Rain should immobilize one group in holding area. Speculate Woodman will not repeat action prior day." Dzhaz was shivering with fear. Maybe it thought *I* had attacked *it*. "Need outweighs risk."

"I know you're after more than information," I told it. "I want you to tell me what makes your expedition worthwhile. Otherwise, you may as well go home now."

"Reiterate, information regarding social disintegration. Such information has vital application."

"What 'application'?" Gwen said angrily. "So ships like the *Stinking Weed* can do a better job? Aren't you satisfied with what they did here?"

"Not understood. Request clarification."

"Dzhaz is playing dumb," I told Gwen, as if it wasn't present. "Socratic

inquiry. It's pretending not to know that *Scented Vine*'s crew caused the Collapse."

At that, the Alien removed its translator plate, held it in front of its visor, then clipped it back on its belt. As expressionless as the helmet was, I had the impression that Dzhaz had just given the translator an incredulous look. "You can believe your ears," I said nastily, "if you have any. *Scented Vine*'s crew engineered the Collapse."

"Impossibility is self-evident," Dzhaz said. "Task too difficult for small crew, restricted timeframe. Study of social disintegration my specialty. Knowledge certain."

"Some expert," Gwen said bitterly. "You can't explain it, so you deny it happened."

"Denial, hypothesis blaming *Scented Vine*," Dzhaz said. "Crew involvement in events marginal, limited to terminal phase. Did not initiate disintegration."

"That's convenient for you." I leaned forward, over my desk. "You can explain why your species isn't responsible for what hit us. Honest scholarship at its best."

"Ritual statement of anger." The shaking had stopped. Dzhaz might have been scared of us, but no academic will take that sort of abuse lying down. "Challenge, prove guilt of *Scented Vine*."

"Oh, I'll prove it." Gwen sounded murderously calm. "Fact. Whenever *Scented Vine*'s crew said anything about humanity, they always belittled us. All of their questions implied that we were deliberately backward. When we asked them to explain things they said were 'obvious,' they suggested that the explanations were too hard for us to understand—even when they *weren't*."

"Request, explain why known falsehoods, subjective opinions of crew accepted as fact."

"These were people from an advanced civilization," Gwen said. "They'd seen who-knows-how-many worlds. They came here, looked around, and told us we couldn't make the grade. That was devastating."

"But it wasn't the only thing they did," I said. "The zapper. People got addicted to it. *Scented Vine*'s crew made a sport out of it."

"Understood," Dzhaz agreed. "Crew activities on record, ship's log and interviews. Agree, actions unworthy. Request, explain nature of addiction."

"You know how the zapper works," I said. "By direct stimulation of the brain's pleasure center. We tried similar, cruder things on lab animals, and they became addicted. All they wanted was the pleasure."

"Explanation inadequate. Difference, experimental animals not sapient beings."

"That's got nothing to do with it," Gwen said. "It's physiological. Once the brain is imprinted, all it wants is more pleasure."

"Partial agreement," Dzhaz said.

" 'Partial,' my tush!" Gwen said. "You never saw the chasers. Once people got zapped, that was *it*. And when word spread, other people sought out the zapper. Lots of people, all over the world. They just dropped out of society. That helped push us over the edge."

"Request, number of chasers, relative to total population?"

"Well . . ." What was the highest

number I'd heard? A hundred thousand? "About one in fifty or sixty thousand."

"Request, this was significant fraction of population?" One of its hands made a small circle in the air with each sentence. Alien body language, I decided: a gesture of emphasis. "Request, chaser subgroup contained philosophers, scientists, artists, social leaders? Request, subgroup made large effort to describe effect of zapper to non-subgroup? Request, subgroup forced others to become chasers?"

"Okay, so most of them were bums," Gwen conceded, "And most of them didn't care enough to talk. But there was that minister, what's-his-name, and that Harvard professor. They got on the news a lot before they died. People listened to them."

"Self-evident, few listened," Dzhaz said. "Self-evident, speakers no longer sane. Request, explain why anyone listened, took statements seriously? Request, explain why chasers viewed as serious problem?"

"All right, I can't explain it." Gwen looked exasperated. "It's like asking me which straw broke the camel's back. The thing is that everyone saw it as a serious problem, and there was no way to stop it—"

"Request, describe attempts made to stop chaser subgroup's expansion."

"We didn't have the time to decide on anything," Gwen said. "Nothing like this had ever happened before. We didn't know what to do."

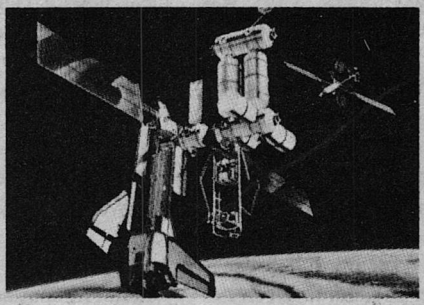
"Incorrect." Two of Dzhaz's hands pressed together. More body language, although I couldn't guess its meaning. "I speak as expert on field, able to make deductions concerning your past through study of other social disintegrations. Long before arrival of *Scented Vine*, you had problems with other addictions. Pattern identical to chaser issue. Limited size, most members non-important to social balance, attempts to curb ineffective, situation viewed with alarm. Addictive behavior seen only in individuals who feel society has failed their needs. This attitude, one of many signs of advanced social disintegration."

I stared out the window at the rain. I felt as bleak and cold as the dark sky. "You're saying that the chasers were a symptom."

"Correct," Dzhaz said. "Consider fact, you are not zapper-addicted. Additional fact, zapper effects non-physical. Addiction possible only in individuals who lack ability, or motive, to resist addiction. Single exposure ineffective on typical member of healthy society. Exposure not sought by such members, not truly enjoyed.

"Additional symptoms," it continued. "Before arrival of *Scented Vine*, great speculation made concerning potential dangers of contact, speculations unfounded but taken seriously, thus showing awareness of social instability. Long before arrival, high incidence of anti-social and asocial acts, crimes, matched by ineffective attempts to restrict. Superstitions, illogical social and political doctrines taken seriously. Warfare considered primary answer to nation-state disagreements—"

"Enough!" Gwen snapped. She looked rattled by Dzhaz's dry assertions. I felt the same way. Maybe the Alien had learned about Earth's problems from *Scented Vine*'s crew, but I didn't believe that even as I thought it.



# NEXT STOP:
# SPACE STATION

*". . . I am directing NASA to develop a permanently manned Space Station, and to do it within a decade." . . . President Ronald Reagan, State of the Union message, January 25, 1984.*

Are you a person of vision? Are you excited about this next new stepping stone in mankind's future? Did you know that there is a magazine that covers these developments better than any other? Did you know that there is a non-profit public interest organization, founded by famed space pioneer Dr. Wernher von Braun, that actively supports all aspects of a strong U.S. space program? That organization is the NATIONAL SPACE INSTITUTE. If you're a member, here's what you'll get:

- 12 big issues of Space World magazine. Tops in the field. Follow the political, social and technological aspects of all Space Station developments—and all other space exploration and development too!
- VIP package tours to Kennedy Space Center to watch a Space Shuttle launch—the thrill of a lifetime!
- Regional meetings and workshops—get to meet an astronaut!
- Exclusive Space Hotline and Dial-A-Shuttle services.
- Discounts on valuable space merchandise and books.
- and much, much more!

So if you are that person of vision, your eyes upon the future, excited about the adventure of space exploration, let us send you more information on how to join the NSI. Just fill in your name and address and our packet will be on its way. AND, we'll send you a FREE Space Shuttle Launch Schedule which is yours to keep whatever you decide to do!

Name _____

Address _____

City, State, & Zip _____

**NATIONAL SPACE INSTITUTE**
West Wing Suite 203
600 Maryland Avenue, S.W.
Washington, D.C. 20024
(202) 484-1111

No, Dzhaz was describing typical events in disintegrating cultures. Ours was merely the latest in a string of intriguing, informative disasters.

You're a Polynesian, and white sailors and missionaries have left your tiny world in shambles. Your one consolation is that it wasn't your fault, that the outsiders were too much for you to resist. Then you come face to face with the fact that your society fell because it lacked the inner strength to survive—

Hell's bells, that comparison wasn't even fair. Most primitive cultures had fought to survive, and shown more resilience than we had.

Gwen's thoughts must have paralleled mine. "Maybe you have a point," she said grimly. "Okay, maybe what happened was our fault. But we might have solved our problems if it hadn't been for the war, and *they started it*. Why should they get away with that?"

"I can answer that," I said. "They didn't start it. It was human suspicion, with the Soviets thinking the Aliens had teamed up with us. Maybe folks in Washington thought the Aliens were working with the Reds, too."

Gwen gave me a look of betrayal. "There was more than that. They shot down all the missiles, which was the only favor they ever did us. Then they turned the war into a joke! A 'tribal squabble. Welcome chance to test repairs to anti-meteor system.' It was all a video game to them! And it brought the government down."

"Request, explain how," Dzhaz said.

"They didn't have enough time to accomplish anything," I said. The Alien's words had blasted me out of a mental rut, and things that should have been obvious all along were becoming clear now. I can't say that I felt any gratitude to Dzhaz for that. "Anyway, I think the governments are to blame. They failed, Gwen, they pushed the button. I doubt anyone would've let them have a second chance to blow us to hell, with or without the Aliens."

"We'll never find out," she said bitterly.

Dzhaz shifted around on its feet. "Request, continue talk at later time." After a moment of silence it left.

Gwen went to the window and watched it disappear into the rain. "They've done it again," she said, clutching the sill. "They're attacking our weaknesses. They won't be satisfied until we're all barbarians."

"I don't think that's what's happening," I said, feeling strangely bemused. "Or if they *are* trying that, Dzhaz just admitted it won't work."

She jerked around, startled. "When did it say that?"

"When it was talking about the zapper. What did it say? A single zap is ineffective against a member of a *healthy* society? Such people don't really enjoy getting zapped—right? It feels nice, but it's degrading, and you have better pleasures. Family. Work that means something. Accomplishment, hope, a future. When you have that you don't slip off into pipe dreams."

"What about the Colonel?" Gwen said. She still suspected an Alien trick, but she wanted to be convinced, to hear that there wouldn't be a second Collapse.

"The Colonel has his problems," I acknowledged. "But think about what he's like. A second Patton, the warrior

incarnate. 'Duty, honor, country.' When he lost his first country, he set out to make a second one."

"The Republic didn't exist when he was zapped."

I nodded. "True, but his military unit did. He gave himself the responsibility of holding it together. He has a will that the zapper couldn't bend . . ."

Things clicked. Weyler had orchestrated the attack to get Washington zapped, assuming that it would break him. The spy at my house must have brought Weyler the impossible news that the zapper had failed with me and could not be trusted to work on the Colonel. If Weyler was going to remove Washington, it would have to be through other means.

And his warriors had a talent for sneaking around unseen—

I grabbed my coat and ran out the door. The path to the north slope and bivouac seemed all uphill in the rain, a waking nightmare. I was out of breath and my heart was pounding when I stumbled up to a sentry post. A soldier in a poncho kept me from falling over. I gasped out something about the Colonel and protecting him, and both sentries ran to his tent. I caught my breath and went after them.

The Colonel was in his tent, sitting up on his cot with the blanket over his legs. He was holding a revolver on a savage, although the look on Washington's face was deadly enough. "I cannot believe," he said in disgust, "that Weyler would try something so *obvious*."

I nodded absently at his soldierly esthetics. The savage glared at me. The rain had washed off his dirt and warpaint, revealing white skin and matted blond hair. It gave him an odd resemblance to a long-ago California surf bum. "Where's Weyler?" I demanded, as the sentries tied his hands behind him.

The savage—hell, the young man—spat at me. I noticed he had bad teeth. "Bring him with me," I told the sentries. I knew what I had to do now, risky as it was.

The rain had slacked off to a drizzle; the storm was passing. Weyler's camp had turned into mud, and the savages squatted under their lean-tos. "Weyler!" I shouted. "Get out here! Face me, you gutless wonder! Crawl out here, back-stabber!"

He came out into the open. He had to, with me calling him a coward in front of his advisors and warriors. He stood about ten feet from me. "What do you want, Renaissance Man?" he asked in contempt.

"You sent your boy to murder the colonel," I said, as the sentries dragged the captive into the camp. "To kill him while he slept."

"What if I did?" he asked. Some of his men smiled at his cleverness. It was merely murder, an acceptable gambit to them—just as we had been ready to go to war to get what we want.

"You have no guts," I said. Using short, simple words is hell for a politician, but I wanted his men to understand me. They spoke English, yes, but only in a crude, limited way. I had to make certain that I left him no escape. "You are lower than a snake's belly. You are the dirt under the pile of crap. You send others to fight for you."

He spat. "So I fight the way you fight. Guns, cannons, airplanes. Your

people hide behind them and kill at a coward's distance."

"We kill that way because you run from us," I taunted him. "You can only face unarmed villagers, and you are the biggest coward of all, hiding behind your warriors. You would not even fight *me*."

Weyler looked me over, up and down, and smiled. I was an old man, like him. I'd been zapped and I'd run a half-mile, and unlike him, I wasn't in prime condition. I was no hardy, hearty barbarian. "And you would not fight me with spear and knife."

"I would," I said.

The Colonel stepped up to my side. "Mr. Secretary, what in *hell* are you doing?"

"I don't have the time to explain." Across the muddy grounds, one of his warriors had produced a spear and knife. I sent one of the sentries to fetch it. "Think of it as the soldier's dream, Colonel. The leaders are going to slug it out."

"Single combat?"

"Just like David and Goliath." There'd been a time when armies sent out champions to do combat, allowing their gods to decide the outcome of battles through them. A good custom, I thought, peeling off my jacket. We couldn't have peace with Weyler, and we couldn't accomplish anything through full-scale war. This would give us a chance.

I looked at Weyler as he prepared for battle. He looked confident of victory, but he didn't know we were fighting according to my rules. To win, he had to kill me, but all I had to do was stay alive and wait for one opportunity.

Washington looked resigned, and far from optimistic. "Mr. Secretary, when fighting, keep your head down, to protect your throat. Face him sideways, to keep him from kicking you in the crotch. Keep your feet apart, so he won't knock you off balance easily."

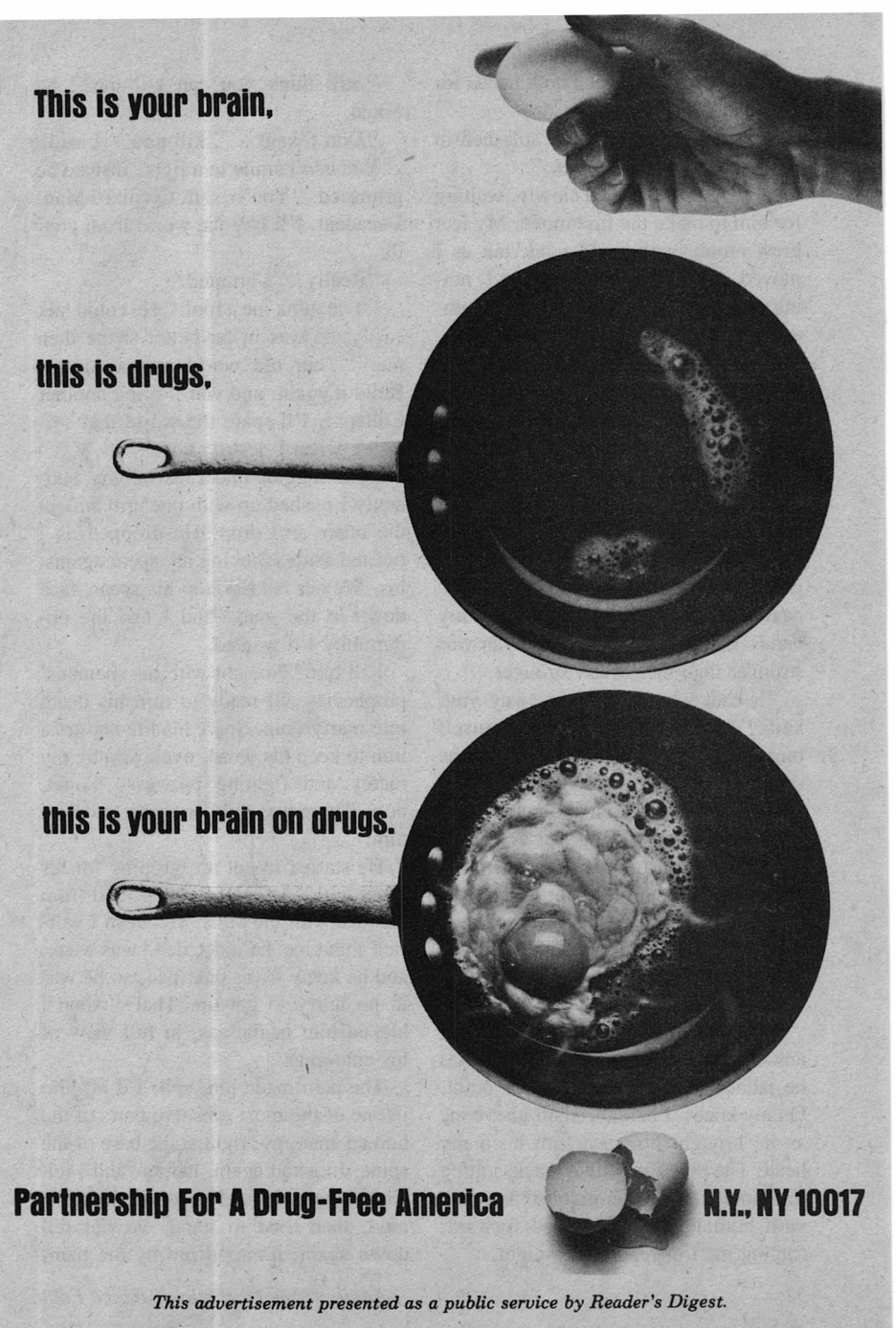
"Okay, thanks." He'd taught me to fight years ago, when I'd joined him as a trooper, but it didn't hurt to hear that again. I removed my shoes and socks, and the sentry brought my weapons. The knife was poorly balanced, but I wasn't going to use it. The spear had a stone point, secured by sinew, and its shaft was good and solid. Fiber lacings served as grips. I tested them and decided they wouldn't slip or break.

"Weyler," I called. I had no right to make the Republic's foreign policy decisions, but I had to give Weyler a reason to fight without making him suspicious. "If you win, we will not attack your tribe, there will be no war. If I win, you will release, unharmed, all the captives taken on your last raid. Agreed?"

"Agreed," he said at once. Then he turned and faced Signal Hill, where the Alien force-field shimmered in the wet air. Several of the Aliens stood just inside the shield, watching us.

"Dark Gods!" Weyler shouted, raising spear and knife above his head. "Ottar-idle, hai! Give me victory!" Prayers said, he faced me and stepped forward, smiling.

I stepped forward. The long grass and mud squished under my toes. The mud was cold, but I'd never have kept my balance in my shoes. When I was within two or three paces of Weyler, I tossed




*This advertisement presented as a public service by Reader's Digest.*

the knife aside. I needed both hands for my spear.

He laughed as the knife splashed in the mud. "You won't win."

"Prove it." I circled slowly, waiting for him to make the first move. My feet grew numb in the cold mud, but as I moved around I tested the ground, noting which parts were slipperier than others, which might give decent footing. After a long moment I settled into a fairly solid patch of ground.

I heard grumblings from the barbarians. They wanted the warrior-king to prove himself in battle, and they disliked our dancing. Good. Every bit of pressure on my enemy helped.

He lunged at me with the spear. I parried it with mine, although the blow nearly knocked the spear from my hands. Gaunt as he looked, Weyler was stronger than me. Much stronger.

"Is that why you threw away your knife?" he asked. "To buy yourself more time?" He swung at me with the spear, twice, toying with me. He danced back, put his knife in his loincloth belt, lunged forward with his spear in both hands. He wasn't much faster than me, I saw. He was an old man, too.

I turned, and for a moment we were face to face, our spear shafts jammed together. "I'll never free any slaves," he whispered. "Even if you win."

"I know," I gasped. He kicked at my ankle and I tripped. I twisted away as he jabbed at me with the spear point. On my knees, I held the shaft above me as he brought his spear down on my head. The poles hit with a crack, jolting my shoulders. Weyler grabbed his spear with both hands and leaned forward, forcing me to support his weight.

"Still think you can kill me?" he asked.

"Don't want . . . kill you," I said.

You can't smile in a fight. Instead he grimaced. "You're soft, Civilized Man. Decadent. I'll free the world from your ilk."

"Really?" I grunted.

"You think me a fool." He could talk easily; he was in far better shape then me. "Your old world was a cancer. Build it again, and you'll bring another Collapse. I'll spare the world that suffering when I destroy you."

I was sagging under his weight. Suddenly I pushed up with one arm and let the other arm drop. He dropped as I twisted aside, shoving my spear against his. Weyler landed atop his spear, face down in the mud—and I had the opportunity I'd wanted.

Kill him? No, not with his shamans' prophecies, all ready to turn his death into martyrdom. Spare his life and trust him to keep his word, overawed by my mercy and fighting prowess? Come, now. There was only one way to defeat him.

He started to get up, groping for his spear with one hand, wiping mud from his face with the other. He wasn't worried about me; he'd decided I was weak, and he knew I was unarmed, so he was in no hurry to get up. That's when I kicked him in the ass, in full view of his entourage.

The pain made him yell. I'd hit him in one of the most sensitive parts of the human anatomy, right at the base of the spine. I kicked again, harder, and I felt something crunch. He sprawled in the mud, then tried to stand. Weyler fell down again, immobilized by the pain,

and I took his knife. It was a good, pre-Collapse blade, and I put it into my own belt. Symbolism is important among savages. Disarming Weyler sealed my victory.

Gwen was standing next to Washington, her face flushed with anger. "Do you know what you've *done?*" she demanded as I joined them.

"I think I broke my toe," I said. It was just starting to throb.

"You didn't win anything," Gwen said, looking across the grounds. Two of Weyler's warriors had helped him up and were wiping away the mud. "He's down now, but what about tomorrow? He'll be out for revenge."

"I know, but right now I'm in control." I faced Weyler and raised my voice. "Weyler! Tomorrow the Legislature will meet in the Forum. Before you leave, you and your men will go to the meeting." I waved a hand at Signal Hill and the Alien watchers. "*They* will be there also."

One of Weyler's old men nodded to me. In the face of their leader's humiliation, they could do nothing but listen and obey—until they got over this. If tomorrow's events worked out right, though, they would never recover.

I turned to Washington. "Colonel, would you send a messenger to the Aliens? Inform them that if they want any cooperation from us they will have a representative at tomorrow's session."

"What's the idea?" Gwen asked, as the colonel left to carry out my orders.

"Gwen, you know that everything Dzhaz said was true. We're going to have to learn to live with it. If we can't, then we're just setting ourselves up for another Collapse."

"Peachy," she said. "What are you going to do? Get up in the Forum and say that the human race is decadent? Why make the Aliens' job easier for them?"

"They aren't here to provoke another Collapse," I said. "If I'm right, we're not in any danger of a Collapse. I can prove everything . . . and when I do, Weyler won't be a problem any more."

"If you're right."

"We'll have to handle things carefully," I said. I planned to play games with beliefs, both ours and the outlanders. That would present more dangers than my duel with Weyler.

While the camp medic came over to examine my foot, I looked at our savages. One of them was ministering to Weyler's injuries, by chanting and waving a gourd rattle over him. The others were on their knees, bowing and praying to the Aliens, hoping for a miracle.

In my way I was doing the same thing, just as I'd done before the fight. My god was Reason, though, a much more demanding deity than any the savages worshiped. If it was going to deliver any miracles, I would have to work for them.

There was silence through the first part of my address. Shock, I suppose, at least among the other legislators. Weyler and his men seemed quietly pleased by my revisionist account of the Collapse. Perhaps it made up for yesterday's humiliation. They had chairs, but all of them were standing, no doubt because Weyler couldn't sit down. I was having trouble staying on my feet; willow-bark tea, our substitute for aspirin,

SCIENCE FICTION
**analog**
SCIENCE FACT

# READER SERVICES

## *MOVING?*

Please give us four to six weeks' notice of a change of address. Please check the appropriate box.

Even if you have notified the post office about your change of address, please fill out and mail this form to us to ensure accurate delivery of your magazine.

## *NEW SUBSCRIPTION OR RENEWAL?*

Eight issues of ***Analog:*** Science Fiction/Science Fact, only $11.97.

## *UNLISTING SERVICE?*

***ANALOG***/Science Fiction-Science Fact makes available to other quality publications and carefully screened companies the names of its subscribers. If, however, you do not wish to have your name made available, please check the appropriate box.

- ☐ New Subscription
- ☐ Renewal
- ☐ Payment enclosed
- ☐ Bill me later
- ☐ Change of address; please note new address
- ☐ Please do not make my name and address available to other publications or companies.

NAME

ADDRESS APT NO

CITY STATE ZIP

*Attach mailing label here and send to:*

***ANALOG***
Science Fiction/Science Fact
Box 1936 • Marion, OH 43305

DAD8A-6

wasn't doing much for the pain in my sprained toe.

Speaker Ryan had virtually handed control of the floor to me for the duration of my speech; only she and Gwen knew what I would say. Dzhaz had shown up, and he kept himself busy with his instruments while I talked about such things as decay, addiction and the Collapse.

"So *Scented Vine* left and we started picking up the pieces," I said. "We never counted on a return visit from the Aliens, because *Scented Vine* was the equivalent of a tramp steamer, dropping anchor at a convenient port. We didn't think they'd tell anyone about their activities here. Even if they weren't responsible for the Collapse, they'd played a role in it, and some of their activities *were* criminal.

"Nevertheless, they talked. Word got around. A group of scholars heard about the incident. They interviewed *Scented Vine*'s crew, purchased copies of their records. They came here to study the Collapse. Isn't that right, Dzhaz?"

The silvery suit turned to face me. "Correct."

I looked around the Forum. "Fascinating, isn't it? *Scented Vine* kept nothing secret, but only a few academics took any interest in their crimes. No galactic government or space patrol became curious. In any event, these scholars came to Earth, detected our radio station, and homed in on it. That brings up another strange point. Why investigate us?"

"Because we're rebuilding!" a legislator shouted. That got a scattering of applause.

"Exactly," I said. "They're interested in us because we're working to restore civilization—or to build a new one. But we have nothing to do with the Collapse; the Republic didn't arise until *after* things fell apart. Yet the Aliens were clearly, undeniably desperate to study us—*us*, not the savages or the warlords. Why?"

No one answered. "It must be vitally important; they even agreed not to carry their zappers among us. Does that mean they're willing to risk their lives to—what? Study a mishap on an obscure planet? Get information to write a footnote? What makes it worth their while?"

"Well, they're *alien*," someone suggested—an Expansionist legislator. I felt glad that a member of the opposition had suggested that. Let *them* look obtuse.

"I thought the same thing, at first," I said. "Dzhaz, one of the Aliens, visited my office the other day. We discussed one of my constituent's problems —two of his cats had been shot by a neighbor's boy. The questions he asked proved that Dzhaz had trouble understanding that we wanted dissent *and* order, that there's a difference between discipline and brutality, the need to assume responsibility—" Light began to dawn on some of the faces in the amphitheater. "You see? What sort of society produces someone like that?

"And what sort of society produces people like *Scented Vine*'s crew? Or lets them run rampant? Without assuming responsibility for their acts?" I had to raise my voice over a growing murmur. The savages looked angry; I was blaspheming against their gods. "They're not 'alien,' any more than the twentieth century was 'alien.' They came here to

learn about themselves." I faced Dzhaz. *"Your civilization is collapsing, isn't it?"*

"Statement of fact," Dzhaz said. Odd, how the translator's flat voice could sound so reluctant. "As experts, self, others able to recognize disintegration of own society. Organize selves into unit, ultimate objective, formulate method to halt or reverse process. One of many techniques, study social disintegration this planet. Last known collapse three thousand local years prior to your collapse; you present opportunity to collect information from survivors, generate new insights, possible solutions."

"You expected to find total anarchy, but when you got here you found the Republic," Gwen said. We'd worked out a compromise the night before, after I explained my perceptions to her. It was good politics to let the head Expansionist handle some of the questions—besides, she'd filled in a few of the gaps in my reasoning. "That changed your plans."

"Statement of fact," Dzhaz said. "Many known cases of planet-wide social disintegration in galaxy. Approximately one half never recover. Of successful half, recovery normally begins only after hundreds or thousands of local years. Full recovery process requires similar time frame."

"We're the exception to the rule," Gwen stated with pride. "And you want us to tell you what makes us so special."

"Partial statement of fact. Improbable, natives understand factors behind own success. You lack training, experience in academic matter. Best chance of success, conceal true motive of investigation, learn answers through indirect approach."

I nodded. There'd been nothing sinister in that; far from it. "It's a basic law of any science," I said. "The process of observation changes whatever you observe. You couldn't risk losing what you might learn here."

"Statement of fact." That had become a litany, confirming my hunches. "We do not know many things. Extreme importance, things we may learn from you—"

There was a sudden upset among the barbarians. The sergeants-at-arms waded in and pulled them apart. Two of Weyler's advisors had taken him and shoved him to the floor. "How can anything be unknown to the Dark Gods?" one demanded.

"Fact, we are like humans." I don't think Dzhaz was addressing the savages. None of the Aliens had ever shown any interest in them. "All sentient species share many traits, fact which makes studies useful. Gamble, can uncover your secret, apply to galactic culture, prevent total disintegration. Alternative, social disintegration on galactic scale, all habited planets and artificial worlds to experience your conditions or worse."

The Alien turned slowly on its three feet, and I had the impression it was sizing up the audience in the amphitheater. "Probability of success low. Evident that your success product of mental, emotional attitude, in itself product of unique conditions. Unlikely to reproduce attitude in other minds. Ultimate failure indicated."

A galaxy-wide Collapse was beyond my grasp. My concerns were closer to

home. The Republic was in no danger from the Aliens—or the barbarians surrounding us. If the looks Weyler's men gave their "king" meant anything, the day of the warlords was over, at least in our corner of the world.

Then Gwen walked up to Dzhaz, something that wasn't in our script. I started to leave the podium; I was afraid she was going to say something vengeful, something that would upset everything. "So you need us to keep your own society from collapsing."

"Correct. Possibility, still time, opportunity to prevent disaster."

I was halfway down the steps when she spoke again. "We'll do what we can to help you."

I had not wanted to see this, but you can't duck your responsibilities, even when the thing you're responsible for is justice. I'd engineered Weyler's fall, and I had to be there at the end.

It had been two weeks since the meeting in the Forum, but things were already changing outside the Republic. The story was slowly percolating through the outlands: the Aliens came to the Republic for help. Their empire was falling apart. They expected the Republic to save them. In the Neutral Zone, the raids had stopped.

The story of Weyler's fall was spreading too, and our outposts reported cautious overtures from the neighboring warlords and chieftains. They wanted to make arrangements with us, before their own people turned on them as well. We were ignoring their appeals.

Weyler's "castle" was a crude stone blockhouse, surrounded by a dry moat and abatis. Our rehabilitation team had pitched camp outside it, and was laying plans to bring twenty thousand exbarbarians and freed slaves into the Republic. Meanwhile, the people made themselves ready to join us.

Gwen had come out to watch the ordeal. She had been rather subdued since the last Legislature session. "Their ship left yesterday," she said, after we finished breakfast in the camp mess.

"Yeah, I saw the shuttle go overhead. Did they say when they would return?"

"It won't be for two or three years, maybe longer. They can travel faster than light, but it's still a big galaxy."

"And we'll have a place in it."

"Along with the Aliens." Gwen looked bitter. "I didn't offer to help them because I forgive them."

"Gwen, you can't blame all of them because *Scented Vine*—"

"I blame them," she said. "Every time I looked at one of them, I saw my husband and children. We may have set ourselves up for the Collapse, but *Stinking Weed*'s crew played a role in events. They were killers, too. Dzhaz never admitted any of that."

"Did you expect him to? He's a product of his society." I shook my head. "I doubt we can really help them."

"I don't care about that, Tad." She toyed with her coffee mug, turning it around and around on the mess hall table. "I made that offer for us. They need *us* to survive. If anything can prove to us, and the rest of the world, that we're coming out of the Collapse, it's that."

Gwen had a point. I had one, too, which I couldn't mention to her. One of the driving forces behind the Republic had always been our hatred of the

Aliens, the feeling that they were to blame for everything. We were losing that now; it had been comforting, but illusions never last, and hate can be one of the worst illusions. It had kept us from seeing the realities behind the Collapse, and that blindness might have put us on the road to a second such disaster.

Even though I was glad we were shedding our hate, I could see the danger in losing part of our motivation. The belief that the Aliens had caused the Collapse had made it possible for us to think that there was nothing wrong with the human race, that we could recover from what had been done to us. Now we would have to take pride in what we were going to do.

There was a metallic clattering outside the camp, a sound like a garbage can being hit by stones. It was time for Weyler's end.

Many of his ex-subjects lined the path from the castle gate. Some of them had walked for days to get here, and they looked eager. Gwen and I climbed to the top of a hillock, where we could see the gauntlet Weyler would have to run.

Two of his warriors dragged Weyler through the gate. He was naked, and tied into a crude yoke. They pushed him down the road, and he stumbled along while the people reached out for him, laughing and cheering.

"It's something I suggested to the rehab team," Gwen said, seeing the confusion on my face. "They need something to rid themselves of Weyler's influences . . . but it had to be something that would break the cycle of killing."

"So you turned him into a scapegoat." A final paganism, I thought. By touching Weyler, they symbolically placed all their guilt on him, and drove it out into the wilderness.

"Executing him would have been too much like a human sacrifice," Gwen said. "Then I remembered hearing about scapegoats in Sunday school. It seemed fitting . . . and after all he's done, Tad, I want to see him *suffer*. This way, he can spend the rest of his life remembering what he's lost."

"What happens when he gets to the border?" I asked.

She shrugged. "I suppose he'll take refuge with another warlord. Let him; he'll never be a king again, but he'll remind the other chieftains of what's in store for them—and show their subjects what to do."

Gwen's vindictiveness made me uneasy, but I knew it wasn't her motive for punishing Weyler. Her punishment rendered him harmless, and it was fitting. After using people for so long, Weyler was being used to help fix the damage he'd done. There was justice in that.

Weyler followed the road, driven by his people, and vanished as the path curved behind a hill. The rehab team was already down among them, beginning the work of leading them out of their long night. ■

● Language is a city to the building of which every human being brought a stone.

Mark Twain

Michael F. Flynn

# AN INTRODUCTION TO PSYCHOHISTORY

Part I of II

A truly predictive social science may seem a distant goal— but quite a few roads seem to be heading in that direction.

*"We have to be prepared to be surprised by the future, but we don't have to be dumbfounded."*

Kenneth Boulding

Has the Great West African War already started? How many race riots will the U.S. experience during the outbreak of 2010 A.D.? How many orbital factories will go bankrupt during the Recession of 2033? Is the imminent breakup of India inherent in her topological connectedness? What does the location of Babylon or the administration of Ancient Egypt have to do with the success of L5 colonies?

Years ago, Isaac Asimov imagined a mathematical "science of history" that could answer such questions. Now, his fictional *psychohistory* is becoming a reality. It hasn't happened yet. No "Hari Seldon" has emerged to tie

everything together; but researchers in fields ranging from ecology to differential topology have already laid the "Foundations."

*"But the curves, if they meant anything at all, included free will . . . Every morning three million 'free wills' flowed toward the center of the New York megapolis; every evening they flowed out again—all by 'free will,' and on a smooth and predictable curve."*

Robert A. Heinlein
("The Year of the Jackpot")

Psychohistory is an attempt to understand the forces driving human history and to express them in useful mathematical terms. In short, to replace anecdote with analysis. Specifically, we want to formulate laws regarding: 1) the internal structures of different societies; 2) their geographical relationships; and 3) their dynamics over time.[1]

This bare statement is enough to trigger cries of outrage. Science is dehumanizing! We need less of it, not more! Laws of history are impossible because people have free will! Besides, human societies are too complex for scientific analysis!

But are these objections valid? Science is the process of discovering the material causes of measurable phenomena. As such, it is de-*mystifying* rather than de-*humanizing*. If conditions like war and poverty have material causes, they can only be corrected by attacking those causes, not by "wishing them away" with good thoughts. At any rate, as anthropologist Marvin Harris observes, the study of culture is not currently suffering from an overdose of the scientific method.

As for free will, freedom is the opposite of compulsion, not of causality. A free choice is not an unreasonable one. That is, it has reasons—or causes—that could be summarized in the form of a law. A scientific law is a description, not a cause, of phenomena. A law of history could no more compel you to behave a particular way than an actuarial table compels you to die.

The complexity of human society only means that laws of history could be hard to find, not that they don't exist. Certainly, many of the examples cited in this article are simplistic; but "simplistic" needn't mean "wrong." Even a simplified analysis can be illuminating. At this stage, no one expects to write down a single, all-encompassing system of differential equations describing every facet of society. After all, the physicists have yet to solve the general three-body problem. A mathematical, scientific approach to culture is just beginning.

Psychohistory is a broad subject, and we can't cover it in depth here; but we can take a look at some of the highlights of this emerging science.

Scientific laws are statistical laws.

(1). Books purporting to psychoanalyze historical figures have been dubbed "psychohistory" by the *literati*, but this is not the science we mean here. Psychoanalysis is a religion, not a science. That is, its premises cannot be proved false by any objective evidence and must be accepted on faith.

They deal with the overall tendencies of large groups. Nuclear physics does not predict the fate of every neutron; nor organic chemistry that of every molecule. In the same way, predicting an individual's behavior is a practical impossibility, meaning it is impossible *as a practical matter* to identify and measure all the factors that influence it. However, in large groups individual variations can cancel out, producing regularities or patterns. Thus, the *average* behavior of a group may be predictable, even though that of the individuals in the group is not. That's what keeps casinos and insurance companies solvent.

Let's look at a few examples of patterns and regularity:

**1. U.S. Slave Revolts/Race Riots** have been plotted in five-year increments on a Shewhart quality control chart (Figure 1). A Shewhart chart is a statistical tool that distinguishes between random fluctuations, inherent in the system, and non-random fluctuations, caused by disturbances to the system. The dotted line is the upper probability limit for a stable Poisson process. This is the same process used to model the emission of radioactive

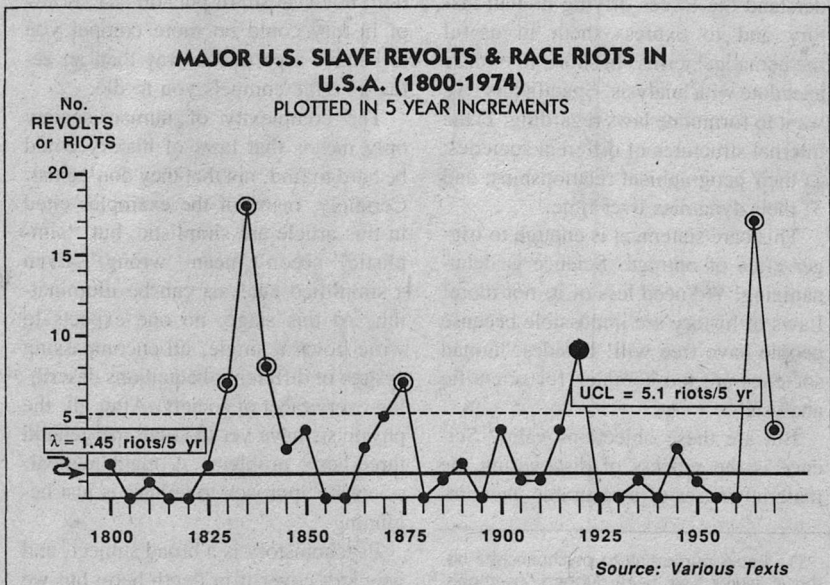



**Figure 1:** The number of slave revolts (or race riots) is generally compatible with a constant Poisson process. The upper probability limit is set at $+3\sqrt{\lambda}$. Notice that freeing the slaves did not affect their status in society. Also notice the regularity of the "eruptions," which suggests the build-up and release of some sort of cultural energy.

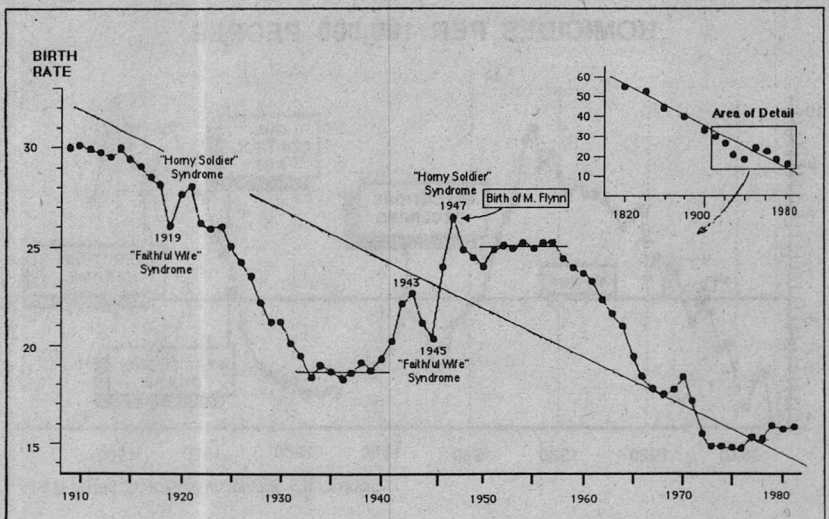



**Figure 2:** The U.S. Birthrate has been declining steadily since long before Pills and women's lib. Notice also the strong cyclic effect. The only major disturbances have been the times when many young males were out of the country.

particles. We see that the U.S. has "emitted" riots/slave revolts at the rate of $\lambda = 0.29$ riots/year for the last 170 years. This average is "built into" the U.S. cultural system. Peaks occur every other generation. The regularity of these peaks indicates a second structural cause.[2] The persistence of the pattern shows that Emancipation did not fundamentally alter the position of blacks in American society; and (unless the Civil Rights Movement *did* change the system) that we can expect the next peak around 2010 A.D.

**2. U.S. Birth Rates** have declined linearly since at least 1820, with Boom and Bust cycles snaking their way around the trendline (Figure 2). The recent "Baby Bust" and the new Baby Boomlet, signaled by the chart in 1979, are only a continuation of this trend. (By the way, notice that the "post war" Baby Boom started *before* the war.) The usual reasons given for declining birth rates (The Pill, legalized abortion, women's lib) cannot explain this pattern. What natural force is at work here?

**3. U.S. Homicide Rates** have only recently returned to the peaks achieved in the 1930s, when executions were common (Figure 3). Do executions (or the lack of them) cause the homicide rate to change? Or do changes in the homicide rate cause people to demand

(2). Of course, it's *easier* to blame the riots on the rioters. But that's like blaming the thunderstorm on the thunder!

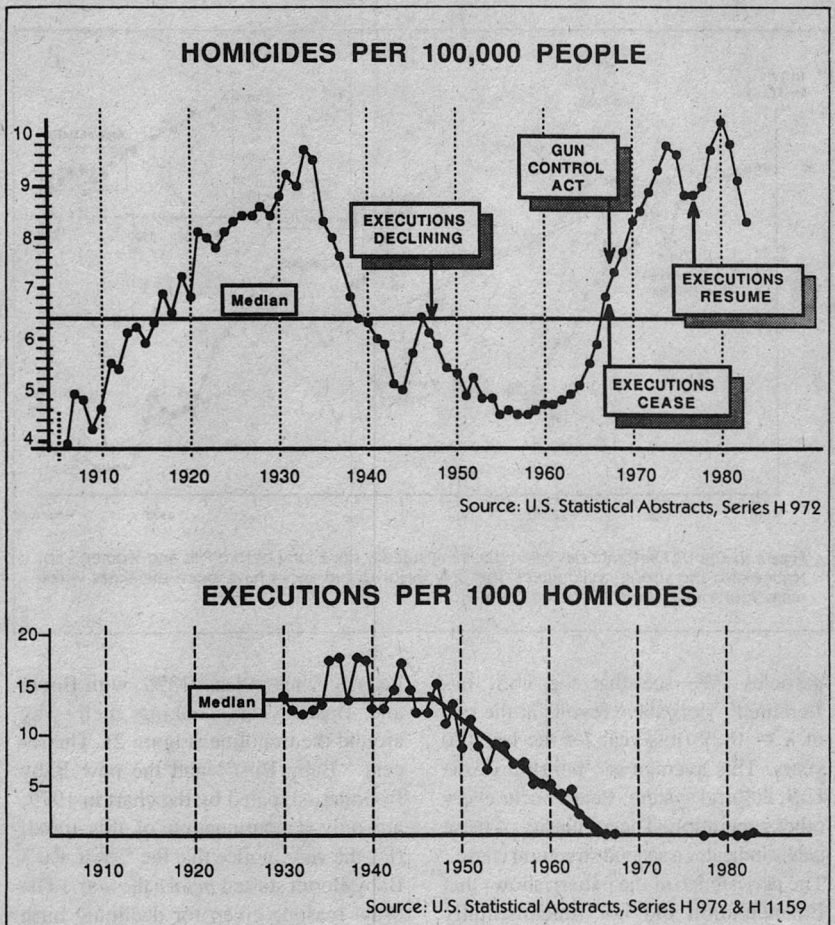



**Figure 3:** If the high homicide rate during the 1970s is due to stopping executions, what caused the high homicide rates of the 1920s & '30s? Note the poor correlation between executions and homicides; or gun control and homicides.

executions? Which is the cause; which, the effect?

**4. U.S. Economic Cycles**, plotted by Dewey and Dakin in 1945, accurately forecast the recent recession, "recovery," and "slowdown in the recovery" (Figure 4a). Economic activities, such as building starts or steel production, follow a composite of these four cycles, which in turn can piggy-

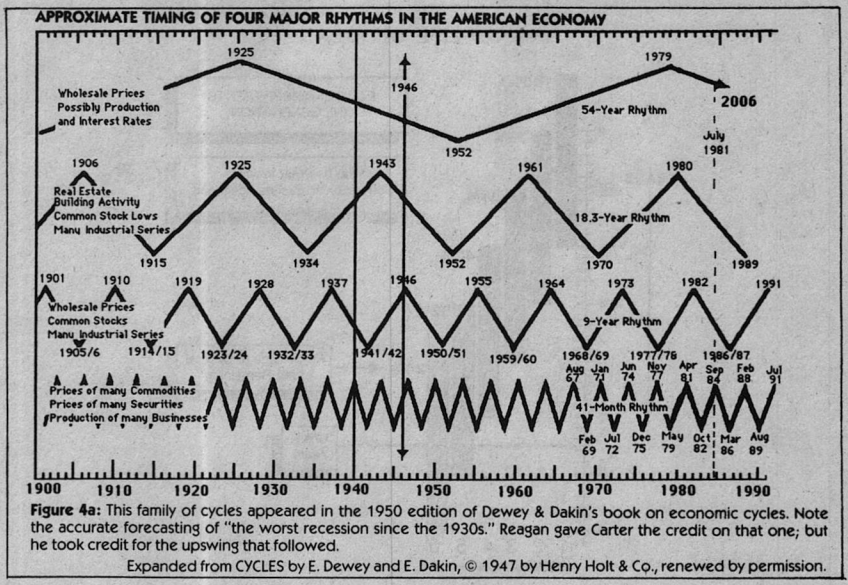



**Figure 4a:** This family of cycles appeared in the 1950 edition of Dewey & Dakin's book on economic cycles. Note the accurate forecasting of "the worst recession since the 1930s." Reagan gave Carter the credit on that one; but he took credit for the upswing that followed.

Expanded from CYCLES by E. Dewey and E. Dakin, © 1947 by Henry Holt & Co., renewed by permission.

back on an S-shaped growth curve (Figure 4b). Seemingly chaotic patterns can often be decomposed into several of these simpler ones, each being the reflection of a basic law.[3]

**5. Half-life of Ideas.** There is often a lag of five generations (ca. 137 years) between the establishment of an idea in a society and the reaction to it (Figure

(3). The 54-year Kondratieff cycle has been traced, in British wheat prices, back to 1240 A.D. Obviously, the root cause cannot be the policies of particular presidents. Yet every time the economic indicators jump up and down, so do the Economists as they "explain" The Cause or, more importantly, Fix the Blame.

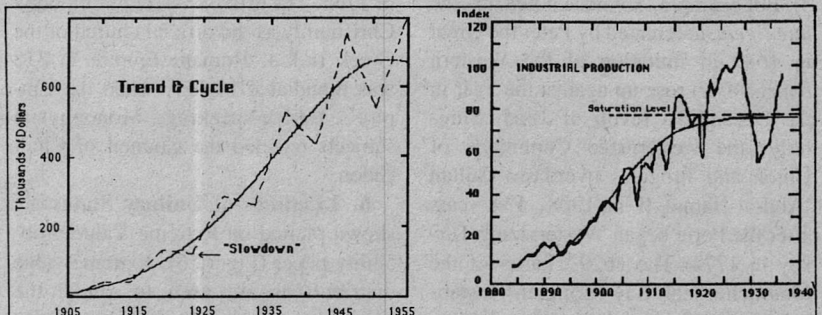



**Figure 4b:** A nine-year cycle with a ±20% amplitude has been superimposed on the growth curve of a hypothetical business. Compare with Davies's Index of U.S. Industrial Production (Dewey & Dakin). Notice how a cyclic downswing can be a "slowdown in the recovery."

CYCLES by E. Dewey and E. Dakin, © 1947 by Henry Holt & Co., renewed by permission.

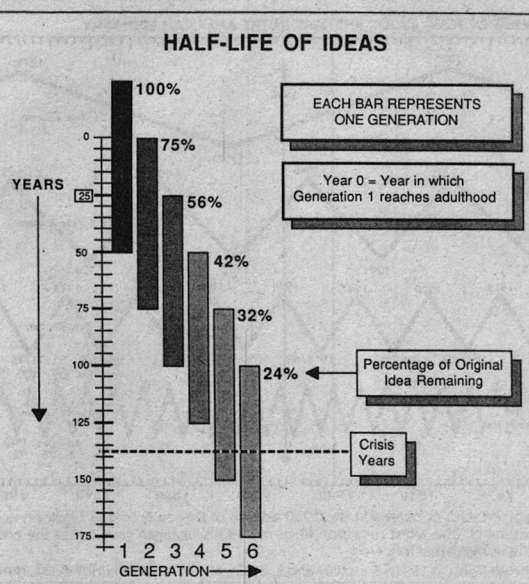



**Figure 5:** Ideas can "decay" as they are passed from generation to generation, as in the children's game where a story is whispered from child to child. Suppose 25% of the information is lost at each stage. The new generation must make up the loss. Thus, Generation 2 ideas are 75% "inherited" from Generation 1 and 25% "original." Generation 6 is the first generation in which their own original ideas equal their "inheritance" from Generation 1. When they reach maturity, ca. 137 years after Generation 1 "founded" their ideas, they are likely to rebel. Organizations with more than five levels of bureaucracy might also have trouble getting the Chairman's message across to the rank and file. This is also why the Babbage Society eventually split, except we must substitute "B was recruited by A" for "B was a child of A."

5). For example, Toynbee noted that the *intelligentsia* (created by Peter the Great in 1689 in imitation of the Western *bourgeoisie*) rose up against the Tsar in the Decembrist revolt of 1825. Similarly, the westernized Committee of Union and Progress overthrew Sultan 'Abd-al-Hamid II in 1908, 134 years after the Porte began Westernizing Turkey in 1774. The 1629 Charter of the Massachussets Bay Company established American colonies for the exploitation of the mother country; an idea that was rejected in the Stamp Act riots of 1765. The establishment of Orthodox Christianity as the official church of the Greek (a.k.a. Roman) Empire in 313 was repudiated in 451, when the Empire's Syriac-speaking, Monophysite subjects rejected the Council of Chalcedon.

**6. Lifetimes of Unitary States** are shown plotted on Extreme Value probability paper (Figure 6). Extreme value distributions are used to model the breakdown of complex systems where failure is of the "weakest link" or "peak overload" type. Evidently, it

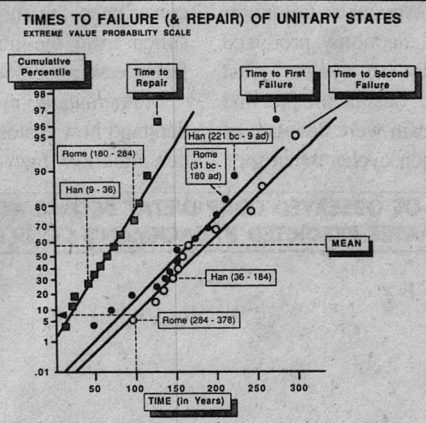



**Figure 6:** A reasonably straight-line plot on probability paper indicates a good fit to the underlying statistical distribution. In this case, the breakdowns and repairs of so-called "universal states" appears to give a good fit to the extreme value distribution. (There is some evidence of multiple failure modes, indicated by "jogs" in the straight lines.) For those unfamiliar with probability paper, the vertical scale is the cumulative probability that an empire will collapse (or be repaired) by the time indicated by the horizontal scale. The intervals are non-linear in order that the plotted data will be linear. For example, reading up from 100 years to the first set of plotted points (open circles), then left to the probability scale, we find that about 7% of all revived unitary states collapse within 100 years of their resurrection. In fact, one out of 11 such "second round" empires did fail (the Roman Autarchy).

doesn't matter if the complex system is electrical, mechanical, or cultural. Empires have a Mean Time Before Failure (MTBF) of 160 years for the first failure. It takes an average of 70 years to "repair" the system (MTTR), which then survives for an additional MTBF of 185 years. Of course, there is also random variation around these averages. What structural factors account for the characteristic life? For variation around that life?

As these examples indicate, cultural processes do exhibit "lawful" behavior. The problem, of course, is to discover the law!

*History being a branch of the biological sciences, its ultimate expression must be mathematical.*

Colin McEvedy

One approach is to devise mathematical equations linking various factors in the social system. We can validate such models by "postdicting" past events. If the model simulates Real World behavior, that is strong evidence in its favor. For example, political scientist Robert Jackman developed a model for *coups d'état* that correlated 92% with the actual *coup* frequencies among Black African states (Figure 7). The model was based on structural factors internal to each country, such as the literacy rate and the percentage of the population engaged in non-agricultural work.

Similarly, Jay Forrester's computer model of the U.S. economy produced 50+ year "Kondratieff cycles," just like the Real World, despite the fact that Forrester and his team were unaware of the existence of such cycles when they constructed the model. The cycles resulted from the linkages between different economic sectors in the model.

Mathematical modeling lets us understand how history works, by turning our attention *away from the symptoms*

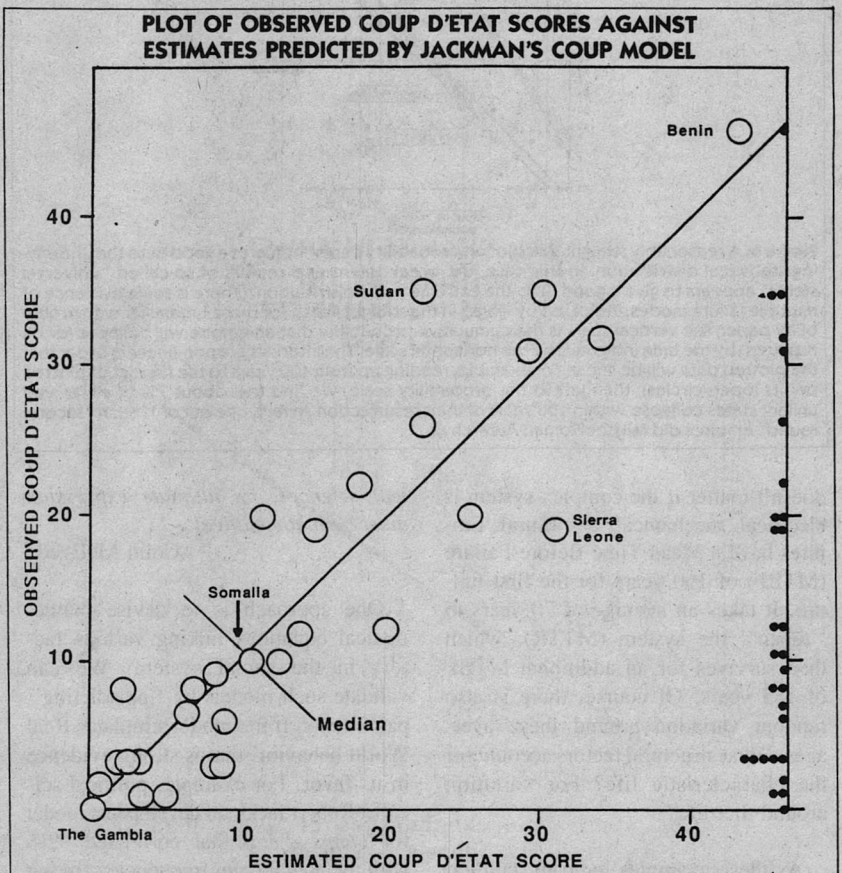



**Figure 7:** The coup "climate" can be predicted by a mathematical equation linking various factors internal to each country. The coup score is a weighted total of abortive, attempted, and successful coups.

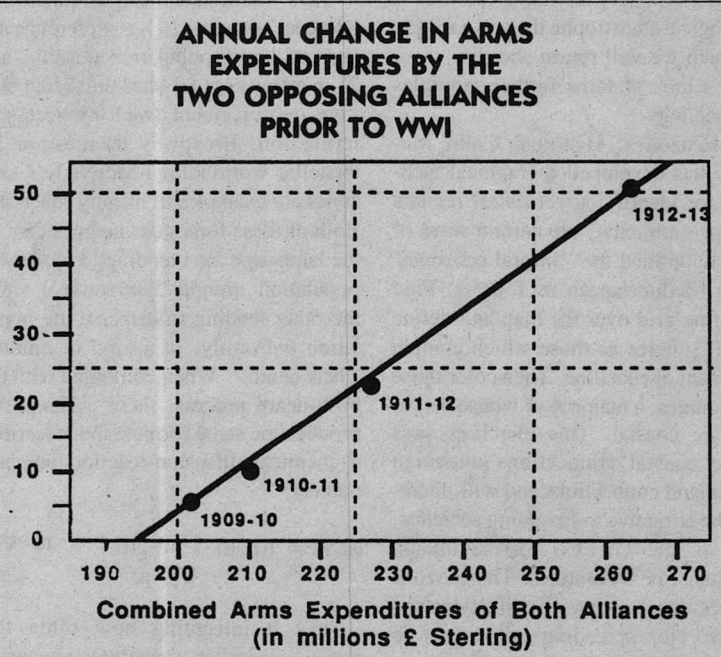
of individual events and *toward the process* that produces them. One early example was Lewis Fry Richardson's model of arms races:

Let **X** and **Y** be the belligerent behaviors of two coalitions. Each will increase in "defensive reaction" to the other. But increases will also be "damped" by economic and other constraints; so that:

$$d\mathbf{X}/dt = a_x\mathbf{Y} - b_x\mathbf{X} + c_x$$

$$d\mathbf{Y}/dt = a_y\mathbf{X} - b_y\mathbf{Y} + c_y$$

Using "expenditures on arms" as a first approximation to **X** and **Y**, Richardson reported a good fit to the arms races that preceded World Wars I and II (Figure 8). The stability point of this system (if it exists) is $d\mathbf{X}/dt = d\mathbf{Y}/dt = 0$, a bilateral freeze. But notice that such a freeze cannot be imposed on the system at any arbitrarily-chosen point (X,Y). Rather, it occurs naturally at a particular point determined by the val-




*Source: L. F. Richardson, "Mathematics of War and Foreign Politics."*

**Figure 8:** Richardson's model predicts a linear relationship between the amounts expended on armaments and the annual increases in those amounts. The pre-WWI data bear this prediction out.

ues of the a, b, and c parameters.[4]

In his book, *Looking at History through Mathematics*, pioneer psychohistorian Nicholas Rashevsky showed how the mathematical techniques of the hard sciences could be applied *in principle* to such historical processes as village and class formation or the "kinematics of social behavior." *Transformations: Mathematical Approaches to Cultural Change*, edited by archeologist Colin Renfrew and mathematician Kenneth Cooke, gives many further examples, including the uses of topological catastrophe theory, a subject to which we will return shortly.

Let's look at some further examples of modeling:

**1) Ecozones.** Historian Colin McEvedy has developed a graphical technique for identifying *ecozones*, regions that are "attractive" to certain ways of life. He defined the "littoral ecozone" in the Mediterranean as follows: First lay a fine grid over the map and define coastal squares as those which contain a segment of coastline. Then color those land squares, a majority of whose neighbors are coastal. This identifies sites whose coastal connections outweigh their inland connections and will, therefore, be attractive to sea-going societies, such as the Greeks, Carthaginians, Venetians, or Byzantines. The ecozone concept may explain why lifestyles and customs stop spreading even when no obvious geographical barrier stands in their way. For example, the distribution of continental monasteries founded by Irish monks during the Dark Ages almost exactly matches that of the ancient Celtic Hallstatt culture. Coincidence or ecozone?

**2) Settlement Formation.** Is there a *general* process that explains how settlements are sited? If there is, it may tell us something about the success of projected lunar or orbital colonies. Robert Rosen has studied this problem. Starting with an abstract landscape and a function, $\alpha$, defining the population density at each coordinate, he postulated two "forces" at work: 1) a preference for sites of lower population density, and 2) an affinity ($\rho$) for sites providing positive reinforcement (such as access to fertile soil, Broadway theatres, or interstellar wormholes.) McEvedy's ecozones are examples of affinity functions. Both of these forces define gradients on the landscape: one tending to clump the population around "attractive" sites, the other tending to disperse the population uniformly, in a kind of cultural "heat death." When combined with the birth-death process, these assumptions produce the same formula that describes a chemical diffusion-reaction process, namely:

$$\partial\alpha/\partial t = [\alpha f(\rho) - \alpha^2 g(\rho)] + D_1 \nabla^2\alpha - D_2\nabla^2\rho \quad (5)$$

Isn't it intriguing how often the same—or similar—equations appear in widely different contexts?

(4). Unfortunately, there is no guarantee that war will not break out before the stability point is achieved. In fact, if anyone knows of an arms race that did *not* end in war, I would be glad to hear of it!

(5). Sorry! I promise not to do that too often. But this is the main reason "soft" scientists resist the very notion of a science of history!

**3. Topological Networks.** The settlements generated by the above processes form the nodes of a topological network. The nodes with the highest connectivity are likely candidates for capital cities. Georgrapher Forrest R. Pitts studied the connectivity of medieval Russian towns (which lie, of course, in the riparian ecozone). Moscow ranked second; nearby Kolumna, first. The older capital, Vladimir, was also in this region. Topologically, Petrograd was an unnatural, "un-Russian" aberration. Similarly, all the major capitals of Mesopotamia (Kish, Agade, Babylon, Ctesiphon, Seleucia, and Baghdad) are closely clustered. Only briefly was Iraq ruled from outside this small region. (Usually from Iran, and even the Achaemenid Shahs preferred Babylon to Persepolis.) A topological analysis of internal commodity movements reveals the startling fact that there are four (or possibly five) Indias (cf. *Ekistics*, by C. A. Doxiadis). These are regions of relatively high population density and industrialization separated by areas of subsistence agriculture, and may represent the future political boundaries of the subcontinent.

**4. Cultural Interaction.** Geographers have found through empirical studies that the amount of traffic (and other forms of communication) flowing between two sites is best described by:

$$I = C[m_1 m_2] / d^k$$

which they blandly call a "gravity model." *Mass* is a function of population and wealth, while *distance* is the time and energy needed to travel between the two sites.[6] Using "nearest neighbor" analysis of Aztec-era settlements in the Valley of Mexico and the known political boundaries, archeologist John Alden derived an empirical value of $k = 1.9$.[7] He then used the model to "postdict" the unknown political boundaries of Toltec-era states. We can use the same model to determine cultural "potential fields," including "natural" political and economic boundaries.

Applied to New York City, for example, we find that the "cultural boundaries" with Boston and Philadelphia lie just short of Providence and Trenton, respectively. At Easton, PA, New York City is nearly three times more "attractive" than Philadelphia.[8]

**5. Central Place Theory.** Villages cannot supply every possible service. Goods offered for sale have minimum and maximum ranges, based on the distances people are willing to travel to buy (or sell) them. This gives rise to a hierarchy of central places (market towns) that, on an idealized landscape, forms a lattice of inter-penetrating hexagons

---

(6). This concept of "cultural distance" explains why High Earth Orbit is "halfway to anywhere" in the solar system. Half the $\Delta V$ is needed just to get that far!

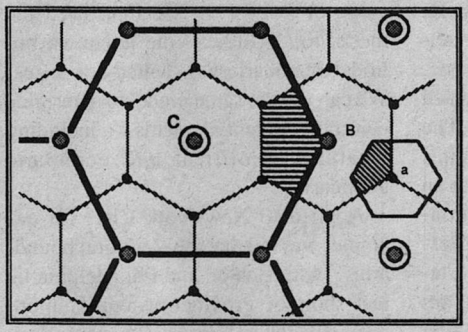
---

(7). Close enough to the inverse square law to cause some serious head-scratching among you physicists out there!

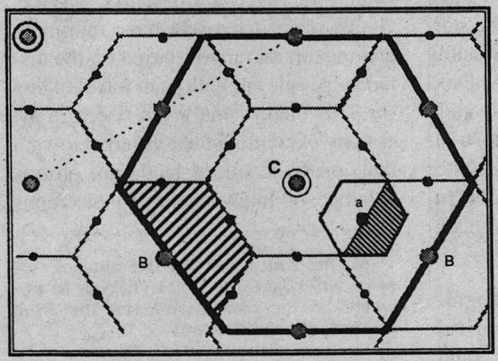
---

(8). Some of you may be puzzled by the use of "attractive" and "New York City" in the same sentence. But, then, a black hole is attractive, too.

called Christaller grids (Figure 9). Central Place Theory, first proposed by the German geographer Walter Christaller in the 1930s and further elaborated by August Lösch, predicts the geographic distribution of central places and the




A Christaller k=3 grid. Each village (lower case a) has a hexagonal hinterland (only one shown on map, for clarity). Each Town (upper case B) includes its own hinterland plus one-third of the six adjacent villages. This adds up to k=3 "hinterlands". Each CITY (BOLDFACE C) includes its own hinterland plus one-third of each of the Towns around it.




A Christaller k=4 grid. In this model, secondary centers appear at the halfway points of lines of communication connecting higher order centers. (See dotted line in upper left corner). There is an "a" halfway between each "B"; and a "B" halfway between each "C". This results in hinterlands that include one-half of the hinterlands of the six adjacent lower order centers, adding up to k=4.

**Figure 9.** On an infinite featureless plain, minimum and maximum market distances will cause towns and villages to array as above. Topography, such as hills, rivers, etc. may distort the grid; so that "distance" must be expressed as a function of travel time + energy. Christaller applied this theory to towns in southern Germany. Flannery, to ancient Mesopotamia. Plattner reports on Skinner's analysis of two regions in China and on Smith's study of western Guatemala. The latter is especially interesting because Smith's study revealed the presence of TWO grids: one of Indian towns and the other of Ladino towns, existing side-by-side, as it were, without "touching."

hierarchical relationships among them. It may also explain the placement of services *within* modern cities: Why some are scattered about (eg. gas stations), while others are concentrated (e.g. Wall Street), and still others are handled by itinerant "circuit-riders" (e.g. visiting consultants) or periodic markets (eg. Tupperware® parties). Many centrally-planned economic reforms fail because they unwittingly work *against* these natural forces. This has profound implications for Third World development.

*"These things are so bizarre that I cannot bear to contemplate them."*

Henri Poincaré

There are three fundamental axioms of psychohistory:

*a) Human societies are homeostatic systems. They are subject to general system laws, of which the laws of physical, biological, and cultural systems are localizations.*

Smith

*b) Human societies are biological populations. They are subject to ecological laws regarding production and reproduction: especially the production of food and other forms of energy.*

Malthus

*c) The causes of cultural institutions are material, not mystical.*

Marx

These are modern restatements derived from what these three gentlemen originally wrote. It may seem odd to list Adam Smith, Thomas Malthus, and Karl Marx as *co*-founders of anything. Marx, for example, called Malthus a "baboon in parson's clothing" and the level of debate in the social sciences has changed very little since then. (Neither has the mutual animosity among capitalists, environmentalists, and socialists.) But, despite their respective shortcomings, all three did try to use the scientific method. In fact, Marx's pronouncement that cultural phenomena have material causes amounts to a simple statement that cultures *can* be analyzed scientifically! A scientist cannot "explain" a custom like Hindu cow love by calling it a religious duty. He must discover natural, material reasons *why it became a religious duty in the first place*.

A homeostatic system is one that "seeks" an equilibrium. Mathematically, we say that the system is "governed by a potential function." A society is attracted so strongly toward its equilibrium that, even when it is disturbed, it will return to its former trajectory once the disturbance is removed (Figure 10). The set of equilibrium points is called the *attractor* of the system. Some attractors are fixed points, like the rest point of a pendulum; others are simple orbits, like the business cycle. However, in complex systems, we must deal with so-called "strange attractors" whose topology is not so simple. The climate, for example, is the strange attractor of the weather.[9]

(9). Strange attractors have nothing to do with the people you meet in singles bars.

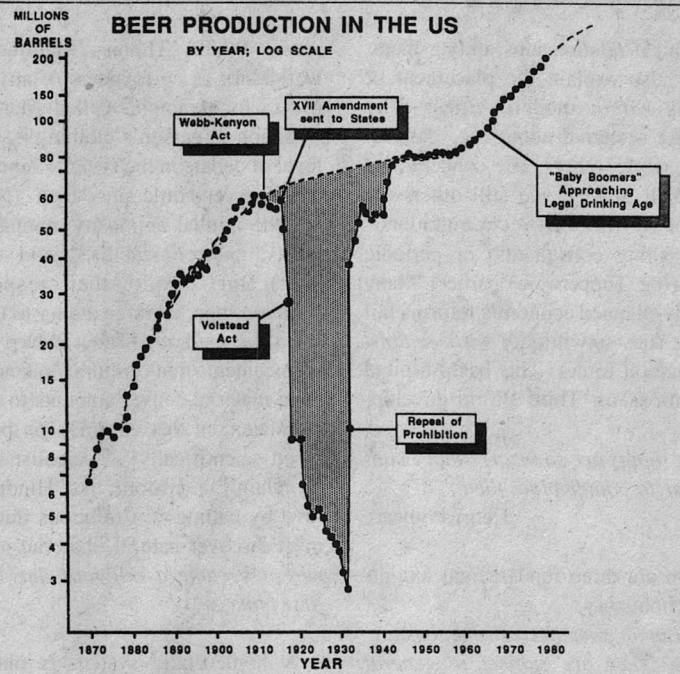



**Figure 10:** Beer production in the U.S. returned to its original growth path as soon as the constraints of Prohibition were lifted. We might suspect that the shaded area represents the amount of illegal beer produced during those years.

Rashevsky developed a mathematical model for the "kinematics of social behavior," based upon psychological stimulus-response theory (making him truly a *psycho*-historian). The model predicts the number, location, and stability of the equilibrium levels; that is, the fraction of the population that will ultimately "exhibit the behavior."

When we see (hear or read about) a new behavior we are stimulated to imitate it. The strength of the stimulus depends upon three factors: **X**, the number of doers ("Mom! *Everyone* is doing it!"), $\mathbf{A}_x$ the persuasive (or coercive) resources of the doers ("C'mon! What are ya, chicken?"), and **A**, the population's innate willingness to imitate. (We won't worry for now how to *measure* those last two!)

Imagine a behavior B advocated by $X_o$, a group of "partisans." Another group, $Y_o$, advocates not-B. The remainder choose either B or not-B as the spirit moves them. According to Rashevsky's model, the equilibrium level is determined by the "coercion/imitation" ratio $(A_xX_o - A_yY_o)/A$. When this ratio exceeds a critical value, C*, a majority of the society will eventually adopt B. If it is less than $-C^*$, a majority will adopt not-B. If it falls in between $\pm C^*$,

then B and not-B are *both* potential equilibria. That is, the society would be attracted toward both levels; and *identical* conditions could cause *different* behavior in different societies!

Theoretically, given the number of partisans for each candidate, plus some measure of their ability to reach and persuade voters, Rashevsky's model could forecast the outcomes of elections. Provided, that is, that the elections were *free* and were always held *after* the equilibrium was reached! Unfortunately, the latter isn't always the case. The equilibrium level itself can change before the system reaches it! The equilibrium is determined by the parameters of the system; and *the parameters themselves are variables*.

Imagine a ball bearing drawn toward a magnet. Very simple laws will describe its trajectory and predict its resting place. But what if the magnet itself is moving? The ball's trajectory is no longer so simple. Cultural dynamics is like that. Imagine the dynamics of a solar system in which the gravitational constant and planetary masses were changing![10]

Usually, small parametric changes result in small changes in the equilibrium; but not always. Sometimes a small parametric change can cause a large, sudden change in behavior. For example, as a rubber band is stretched, it grows incrementally longer—until it passes through a singularity and snaps, a behavior utterly unpredictable by extrapolating its past growth. Societies can snap, too. Revolutions, coups, fads, economic booms & busts, technological breakthroughs. Sudden change often interrupts the path toward equilibrium (Figure 11).

Perhaps the most dramatic such changes have been the collapse of certain state-level societies, whose complex structures simplified rapidly into chiefdoms or even tribes. The collapses of the Mayan and Aegean societies were the most complete of such collapses; but

(10). Hmmmm.

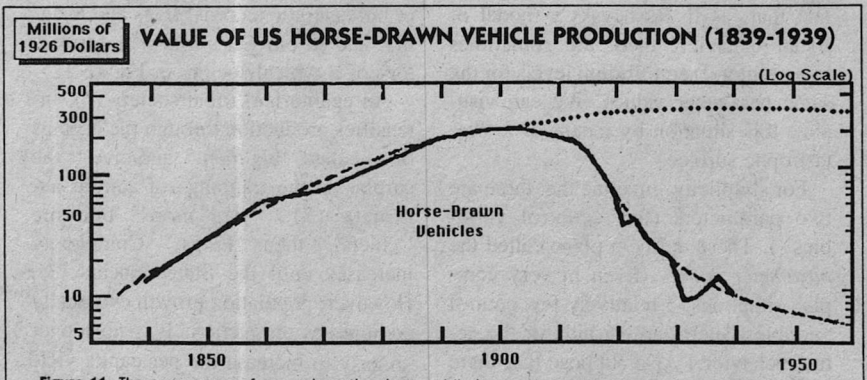



**Figure 11:** The appearance of a new invention (automobiles) caused a sudden change in the trend for horse-drawn vehicles. It would be interesting to graph the total production of *all* vehicles, horse-drawn plus horseless! On a per capita basis, or normalized to something like "passenger-miles per dollar," it should produce a consistent S-curve.

CYCLES by E. Dewey and E. Dakin, © 1947 by Henry Holt & Co., renewed by permission.

the Egyptian society after the VI Dynasty or the Graeco-Roman society in Western Europe are also well-known examples. Could it happen here? There are also cases of equally-sudden complexification: e.g. the formation of the Saxon and Zulu kingdoms or of the Iroquois Confederacy. A smaller scale example is the collapse of passenger railroads in the U.S. Passenger miles increased and decreased in sudden "exponential epochs." What are the causes of sudden change?

We usually blame sudden change on *exogenous* factors: barbarian invaders, communist subversives, outside agitators, the CIA, and the like. The change is "forced" on the society by external forces. However, **topological catastrophe theory**, developed by René Thom, has shown that sudden change can result from *endogenous* factors, internal to the society (cf. Ian Stewart, "What Shape is a Catastrophe?" *Analog*, June, 1978).

The roots of sudden change lie in the fact that, as in Rashevsky's model of social behavior, there are sometimes two (or more!) equilibrium levels for the same parameter values. We can visualize this situation by means of a "catastrophe surface."

For simplicity, imagine that there are two parameters (the "control variables"). These define a plane called the *parameter space*. (Even in very complex situations, a relatively few control variables determine the bulk of the actual behavior.) Also suppose that there is one state variable, represented by a potential function, and express this as vertical distance above the parameter plane. For each point in parameter space there is one (or more) equilibrium state. The set of all equilibrium points forms a manifold that sits over the parameter space. This is the "catastrophe surface." Thom's theory states that there are only seven "elementary" surfaces. For two control variables and one state variable, that surface is called the Cusp, a sheet with a pleat, or fold, in it. Let's look at two simple examples.

**1. Collapse of State-level Societies:** Archaeologist Colin Renfrew developed a cusp surface to describe the sudden collapse of early agricultural societies. The two control variables were **E**, the energy assigned to cultural devices used to promote adherence to the central authority; and **M**, the margin between productivity and taxes. The state variable is **C**, the "degree of centrality," which is some measure of the information carrying capacity of the society.[11] Archaeologically, **C** is indicated by a Christaller grid of central places, the maintenance of bureaucratic records, flags and insignia, and so on. Let's follow the trajectory of a typical society in Figure 12.

An egalitarian, tribal society (1), intensifies production through the urgings of so-called "big men," and invests the surplus in the trappings of central authority (2). "Big men" become "chiefs," then "kings." Complexity increases until the State appears (3). However, population growth eventually compresses production. It is no longer so easy to increase the per capita yield enough to support the central authority.

(11). No, the model is *not* $E = MC^2$. That would have been cute, though.

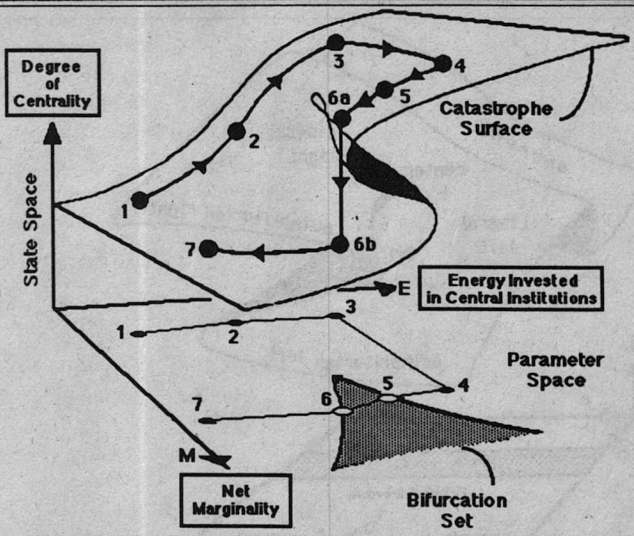



Figure 12: The life of an early state-level society. Collapse (from a high level of complexity to a lower level) occurs when the parameters pass through a region known as the bifurcation set. Smooth continuous change in the parameters results in sudden, "discontinuous" change in the state of the society (at point 6).

Source: Renfrew & Cooke, Transformations: Mathematical Approaches to Cultural Change



The society is under stress (4). As **E** decreases slightly, the society enters a region of the parameter space called the "bifurcation set" (5). In this region, there are *two* equilibrium levels for which social efficiency is maximized. However, inertia (caused by the time lags or "viscosity" of the system) keeps the society on the upper fold of the pleat (6a). Then, as the society leaves the bifurcation set, the local maximum vanishes, and it is now attracted only by the lower sheet (6b). The society "falls" off the edge of the fold. The drop will not, of course, be instantaneous, but it will be exponential.

Renfrew went on to add two more control variables (kinship and external threat), producing the multi-dimensional Butterfly Catastrophe, whose hypersurface contains a pocket. The pocket in this example corresponds to stable chiefdoms, a level of social complexity partway between tribal and state organizations.)

**2. Political Ideologies:** E. C. Zeeman developed a cusp model of political ideologies. The two parameters, **A** and **B**, were economic (opportunity *versus* equality) and political (the rights of the individuals *versus* the rights of the group). The state space was a "cloud of points" representing the opinions of the individuals in the society. (These are measurable, at least in theory, by opinion polling.) The cloud was embedded topologically in a one-dimensional space, **Y**, which turned out to be the traditional

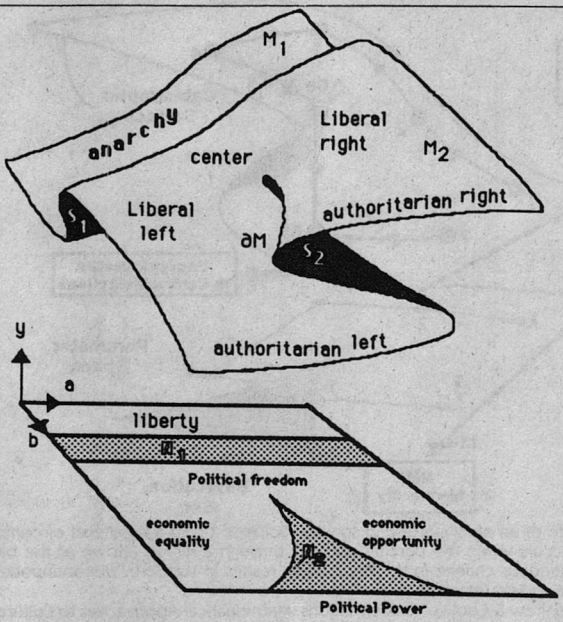



Figure 13: A topological model of political ideologies. The shape of the catastrophe surface is a consequence of the two parameters, Political and Economic, and of Thom's Theorem. The state space (vertical axis) is a one-dimensional embedding of a multi-dimensional "opinion space" and corresponds to the traditional "left-right" political axis, which was based on the seating arrangements in the Parliament of the French Third Republic (monarchists on the right, republicans on the left!)

 Source: E. C. Zeeman, "A Geometric Model of Ideologies"

left-to-right political spectrum. Zeeman's catastrophe surface shows why this simple line really has a complex "anatomy" (Figure 13). Projecting the surface onto the **AY** and **BY** planes reveals why dictatorships of the left and the right resemble each other so closely, and why right-wing populists often sound like left-wingers. It also shows why some social changes *must* be revolutionary; and why one-party states frequently develop left and right wings within the Party.

We have seen that cultural processes are, at least in principle, susceptible to mathematical analysis and modeling. Far from being inappropriate, the tools of the hard sciences can have great utility here. Not the least benefit would be the translation of cultural theories into rigorous *testable* format, something now usually lacking in the "soft" sciences.

However, even the most sophisticated mathematics is sterile. We must also have a theory to support it. That brings us to the other two Basic Axioms, the subject of Part II. ■

CONTINUED IN NEXT ISSUE

# on gaming

## Matthew J. Costello

The Consumer Electronics Show is a gaudy affair, where the electronics moguls of the world descend on Las Vegas (in January) or Chicago (in June) each and every year. It's a closed, trade-only show that gives buyers for the big department stores and the home electronics dealers a chance to see (and order) merchandise that will be released in the coming year.

While sometimes you can see the "future" at the show, all too often the companies parade around in the Emperor's New Clothes admiring each other's wardrobes.

The computer and software companies aren't that much different. When an idea does explode (like the recent "second wave" of video games) everyone tries to jump onto what they perceive as the next big, and lucrative, thing.

I was voicing these thoughts at last year's CES, or something quite similar to them, when Peter Olotka of Eon Games told me that there was, indeed, something new under this convention's roof.

(Peter, by the way, is part of the design team responsible for Eon's *Cosmic Encounter* and *Dark Over* games, not to mention recent forays into the videotape game market with an *Ellery Queen Mystery Game* for Spinnaker.

It was, he told me, a revolutionary device called DirectED (Videonics, Inc., 1129 Dale Avenue, Campbell, CA 95008-6611) and he suggested that I get over to the Videonics booth and check it out. Eager to see something that novel, I went directly over and, for a moment, I was confused. DirectED appeared to be some high-tech videotape editor. You could take your hours of tapes, featuring Johnny's first steps, or Spot's first litter, and Uncle Al's remarkable recovery from his three-car pile up on the Santa Monica Freeway, and edit them into a finished production. You could add graphics, titles, moving scenes around, turning the whole package into a professional looking show.

Which interested me not a bit. Families were spared, in the days of three-minute super 8 films, the wonder of completely documented meals and repeat viewings of three-hour *Trivial Pursuit* games.

But then I saw the device for what it was. The DirectED was capable of memorizing the location of scenes, then you could access those scenes by merely pressing a button on the remote control. What we had here was nothing less than interactive videotape, something that was still down the road for laser disks. Its potential for games was incredible.

Using DirectEd, a whole new generation of video games could be created, not the largely silly videotape games that have flooded the market recently, but a real interactive game using realistic footage.

Imagine a game where you could

*(continued on page 184)*


SEANCE
Rick Cook


It's been said that a sufficiently advanced technology is indistinguishable from magic. Or from a different advanced technology . . . .

"I don't know if my ex-wife is onto the deal of the century or if she's being fleeced unmercifully." My visitor's mouth twisted as if he had bitten into something sweet and sour at once.

I leaned forward in my chair and studied him. John Ionelli was tanned, slicked back and casual, but just a shade too carefully groomed and with just a little too much chest and shoulder bulging under his expensive sport coat. A California yuppie laid over—what?

"Unmercifully," he repeated. "If she is being conned, that's the word for it."

"Look, Mr. Ionelli," I said. "We're investment advisors, not private detectives. If you think your ex-wife is being cheated, shouldn't you be talking to the police?"

"Doc, you're high tech investment advisors, right? So I need advice. If Janet isn't being had, if this is for real, I want a piece of the action. And if she is . . ." he leaned forward and put his palms on my desk as if he was going to spring at me.

"If she is," he finished savagely, "I want to take the sonuvabitch apart myself."

"Well, uh yes." Underneath that polish was something raw and dangerous. "Now, what is it your ex is involved in?"

He leaned back into the chair. "Doc, do you believe in reincarnation?"

"Uh, I really hadn't thought about it much. Various religions, of course . . ."

"I don't mean religion, I mean bringing the dead back to life."

This was getting weirder and weirder. I had agreed to see John Ionelli as a favor to a friend and regretted it as soon as he opened his mouth. Now I was considering how to best get him out of my office before he assaulted me. I'm six-foot-nine and not exactly weak, but the man across my desk must have weighed over 220 pounds and very little of it was fat. I could see the muscles in his shoulders ripple under his jacket and open-throated shirt when he moved.

"No," I said finally. "I don't believe in bringing the dead back to life."

He hesitated and went off on a new tack.

"What do you know about artificial intelligence?"

"That is an area in which we invest our clients' money, so I am fairly conversant with it. However our real specialist in that area is Karen Nash. I could arrange for you to meet . . ."

"Have you ever heard of a guy named Campbell, Woodrow Campbell?"

"That name is vaguely familiar. Perhaps Ms. Nash . . ."

"Campbell is the guy who got Janet into this. He and a guy named Willard Schultz set up a company called PerSim." He grinned ruefully. "Have they got a beaut of a sales pitch!"

"What's that?"

Ionelli made the sweet/sour face again.

"They say their computer can recall our dear departed from the Great Beyond. They've got my wife convinced they can let her talk to her dead father!"

It took three days for Ionelli to convince his wife that he did know someone who might be interested in investing in PerSim and that it wasn't part of some post-divorce game. Janet Anderson-Ionelli turned out to be a poised, slender

blonde in her early thirties. When she met me on the terrace of her country club she was wearing a tailored linen suit and pastel silk blouse with a jabot which set off her Waspish good looks. She was sitting at a tiny table overlooking greens that rolled down to the gray sunlit sea, sipping something tall and iced. She extended her hand for me to shake and motioned me into the chair opposite. Once my drink was ordered, she eased into the business at hand in her own way.

"You never knew my father, did you, Mr. Carpenter?"

"You mean personally? No. I knew of him, of course. I used to watch his news shows all the time."

Me and sixty million other people. Winston Anderson had been one of the top network newsmen of the 1950s and '60s. At one time he was "the most trusted man in America" according to the polls. In his day he was simply a fixture in American life, like tailfins on cars.

"So few did," Ionelli's ex-wife said. "He was a remarkable man, Mr. Carpenter—strong, vital. That was the secret of his success. That image on television, it wasn't just an image. He really was like that. He was so . . ."

"Overpowering?"

She dropped her eyes. "I suppose that's a good word for it. He was always so—there."

The probing sea breeze loosened a strand of her fair hair and it blew prettily across her forehead. It reminded me of Botticelli's Venus, but she didn't seem to notice.

"And then suddenly, he's gone," she continued, raising her eyes to meet mine. "It was a heart attack, you know. One day he was perfectly fine and the next day he was dead."

"It must have been a shock," I said sympathetically.

She smiled. "Oh, it was. A tremendous shock. I was married and we had been somewhat estranged for several years. But to have him pass away like that, it was just . . ." she sighed. "Well, it left me with a lot of unfinished business with my father."

The waiter arrived with my drink and in the laying down of napkins and signing of the tab, my hostess lost the mood. She also tucked the strand of hair back into place. A loss all the way around, I thought.

"In any event," she went on briskly, "Mr. Campbell approached me because he knew I had inherited a videotape library of my father's newscasts. There were nearly four thousand of them, you know. He felt that the collection would make an ideal subject."

*That and the money your father left his only child,* I silently added.

"How much has been invested in the project so far?"

"I really don't know," Janet Anderson-Ionelli said. "Does it matter?"

"For my clients, yes. I have to know what the capital structure of the company is and what sort of equity position we can expect in return for our investment."

"I'm sure Mr. Campbell can give you the details you need. I am only one of the investors, after all."

That much was correct. According to her ex-husband, Janet Anderson-Ionelli had something over eight hundred thousand dollars in this deal. And God,

Woodrow Campbell, and Willard Schultz alone knew how much others had put into the company.

"You understand, Mr. Carpenter, that this is strictly a prototype, a demonstration model," Woodrow Campbell said as he ushered Mrs. Ionelli and me into the tiny inner office.

The setup was pretty much stock for Silicon Valley. An overcooled cubicle perhaps ten by ten, walled in cheap dark paneling with a dark blue carpet, nonstatic, on the floor. The filing cabinets and floor were piled with bound printouts and on the desk, surrounded by a litter of papers, fast-food wrappers and such, sat an IBM microcomputer with a couple of lines of cryptic characters glowing gold on the screen. On top of the bookcase, acting as bookends for more printouts were two speakers, and an FM tuner/amplifier sat on the shelf below them.

Campbell was pretty much stock as well. A tanned, lean man in his forties with carefully coiffed hair, carefully casual dress and a carefully persuasive manner. One of the money boys; the executives who convert the technie's dreams into realities and try to make everyone rich in the process. I think there's a factory somewhere in Sunnyvale that stamps them out.

Hunkering down in front of the computer came as a relief. I had to duck to get through the door and my head was uncomfortably near the seven-foot ceiling when I stood.

"How does this thing work?" I asked.

"Well, the details are proprietary, of course," Campbell said. "But I can tell you generally what it does. In essence, it's a personality simulator. With over 100,000 lines of LISP code, it is probably the most complex one ever written. Underneath it all is an expert system using a rule-based inference engine with adaptive features. What you see here is only a front-end processor, really just a smart terminal. The work is done on a remote mainframe."

"I wasn't aware that these things were that advanced."

Campbell smiled knowingly. "This is the absolute leading edge of the technology. My partner, Willard Schultz, is one of the foremost workers in the field."

That was not precisely the word I had on Schultz, but I didn't contradict him.

"And you can actually make someone live again in this box?"

Campbell laughed, "No, Mr. Carpenter, that's a misconception. What we can do is make the computer respond just as the person would. In a sense, of course, they are alive again for their friends and loved ones. The computer program becomes the person."

"Show him, Woodrow," Janet commanded. I glanced over at her and saw her lips were pressed together and drawn in, as if she wanted to lick them. "Show him."

"Very well," said Campbell goodnaturedly. "I really shouldn't do this without Mr. Schultz, but I suppose . . ." He sat down at the computer and typed briefly. A couple of lines of commands appeared on the screen and then it blanked except for the cursor in the upper right hand corner.

"Do you want to take it from here, Janet?" Campbell rose from the chair

and Janet slid in almost before he was out of it.

FATHER, she typed, and a red light glowed on the front of the computer.

"Hello Janet."

The voice filled the room, warm, rich, more resonant and alive than it had ever been over television. I started and looked toward the speakers on the bookcase. Sitting on top of the tuner was an innocuous black box. A high-quality speech synthesizer, I saw now, one that probably cost four or five times as much as everything else in the room.

"Very well today. What's the weather like?" Again the voice of Wingate Anderson filled the room. I looked back at the screen and saw that Janet had typed HOW ARE YOU, FATHER? Now Janet was typing again and the red light on the computer was on.

THE WEATHER IS WONDERFUL, FATHER. BRIGHT AND SUNNY. JUST THE WAY YOU LIKE IT.

"I'm glad, Janet," the computer said. Then it sighed wistfully. "You know, I do miss the weather." Then it chuckled. "But when we moved to California, I said I missed the changing seasons. We are never satisfied, I guess."

I hadn't known quite what to expect, but this was unnerving. I'd heard plenty of computers talk, but it wasn't like that at all. This was a human voice, with all the little pauses and mannerisms that make us sound like real people. Moreover, it was a voice I knew, a voice I had grown up listening to on the nightly news. Then I looked back at Janet Anderson and I was more than unnerved, I was scared.

She was leaning over the keyboard as if she wanted to dive into the computer screen. her eyes were shining and her face was lit up like a child's at Christmas. Now she really did lick her lips.

WE ALL MISS YOU FATHER. She typed. I SAW HARRY JACOBI THE OTHER DAY AND HE ASKED ME HOW THE PROJECT WAS COMING.

Again the red light winked on, like a baleful eye gazing out into the room. All of a sudden that user-friendly little box on the desk reminded me of HAL, the mad computer in 2001. "I miss you too, Janet," the disembodied voice went on. "I hope Harry's well."

HE'S FINE FATHER. STILL GRUMBLING ABOUT THE WAY THINGS HAVE CHANGED. HE CALLED THE NEW NEWSCASTERS THE "BLOW-DRY BOYS."

"Yes," said Winston Anderson's personality through the speakers on the bookcase. "Television newscasters don't have the integrity, or the news sense we who were trained in radio did. But now that I'm out of the business, I shouldn't criticize."

"Out of the business," had to be the neatest euphemism I'd ever heard for being dead—particularly coming from the "lips" of the dead man.

"As to how the project is coming, you'll have to ask Woodrow and Willard." Again that disconcerting chuckle. "I never was very good on the technical details."

"Speaking of the technical end," I said quickly to Campbell, "perhaps we could discuss this further."

"You two go ahead," said Janet, never taking her eyes from the screen. "I'll stay here and play some more."

*That's not what I'd call it,* I thought

as I ducked through the door and into the outer office.

"Well, what do you think?" Campbell asked as we settled onto the couch.

"Impressive." Which was an understatement. I was still shaken from listening to the thing. And from watching Janet.

"It's just a prototype, of course. We've still got work to do before the system is marketable. But we think it has amazing potential."

"Such as?"

"In the short term we can expect to provide not just expert simulations, but expert personality simulations. Programs that not only have the knowledge of their human armatures, but their personalities. As you may know, there is an increasing body of thought in AI research that says that the personality is at least as important as the knowledge base in capturing a human expert."

Repressing thoughts of flies in amber, I went on. "You can capture a living person's personality?"

"Not capture, Mr. Carpenter, reproduce. Yes, and a living person is theoretically easier to reproduce than a dead one. When the armature is still alive we can get a better range of responses for the inference engine to process.

"That's the main limit, you see. The more of the person's response pattern we have available, the easier it is to simulate the personality. That's why Ms. Ionelli"—he was careful to pronounce it "ms"—"was such a lucky find. She had a huge tape library of her father's broadcasts."

*And a pile of her father's money,* I thought. "So you couldn't do someone like George Washington, could you?"

Campbell gave me another one of those phony little smiles. "Actually, we think we could, given enough development. It would be approximate, of course, but with research and the help of competent scholars, there is no reason why we could not simulate all the founding fathers. It's a dream of mine, really."

*Wonderful. The Soviets have Lenin, the Chinese have Mao and we're about to get the whole bloody pantheon. I wonder if that damn thing can simulate Jesus Christ, too.*

"All that with that little system?"

Campbell smiled and shook his head. "No, that's just a very simple version. Even for that, it takes mainframe processing power. That machine is just a terminal, really. We will need a lot more development work and a much larger computer with a specially designed coprocessor to get to that stage.

"How does one go about investing in this operation?"

"Well, that's somewhat difficult right now," Campbell said in a carefully judicious voice I recognized from my time in the venture capital game. It means the guy wants to make sure he has the hook planted firmly before he starts reeling you in. "We've nearly completed our first round and . . ."

"WOODROW!" Janet shrieked from the other room. "Woodrow, the damn thing's locked up again!"

Janet was sitting at the terminal with her fists clenched, as if she wanted to assault the computer. The screen was filled with what looked like random

characters and the little red light was glowing.

"You must have pushed it too far again, Janet," Campbell said soothingly as he bent over. "Oh dear. I'll have to get Willard to untangle this."

"I haven't hurt him, have I? The program, I mean."

"That's very unlikely, Janet. But you must remember this is only an experimental model. If you try to go too far, you'll exceed its limits."

"Yes, I know," Janet said. There were tears in her eyes.

"Why don't you and Mr. Carpenter go on now and leave this to me?" His tone was the one you'd use on a small, sleepy child who was past her bedtime and wanted to stay up for the party. "When Willard gets in, he'll sort things out."

Janet Ionelli allowed herself to be led from the terminal and out the office door. As we walked out to the parking lot she pulled herself together and by the time we reached my car, she was the cool, self-assured woman I had first met.

"Now what do you think?" she asked as I slid behind the wheel.

"Quite remarkable."

"You see the potential don't you? What it could be?" It didn't take a mind reader to follow her thoughts. The more money invested, the sooner the thing would be ready and the more time she could spend communing with Daddy.

"I've never seen anything like it," I said as noncommittally as I could manage. She arched an eyebrow at me.

"But . . . ?"

"Mrs. Anderson, you do realize that even if this thing succeeds, what is in that computer won't be your father?"

"I realize that perfectly, Dr. Carpenter," she said frostily. She snorted. "My ex-husband to the contrary, my involvement with this project is neither a father fixation nor a sign of mental imbalance.

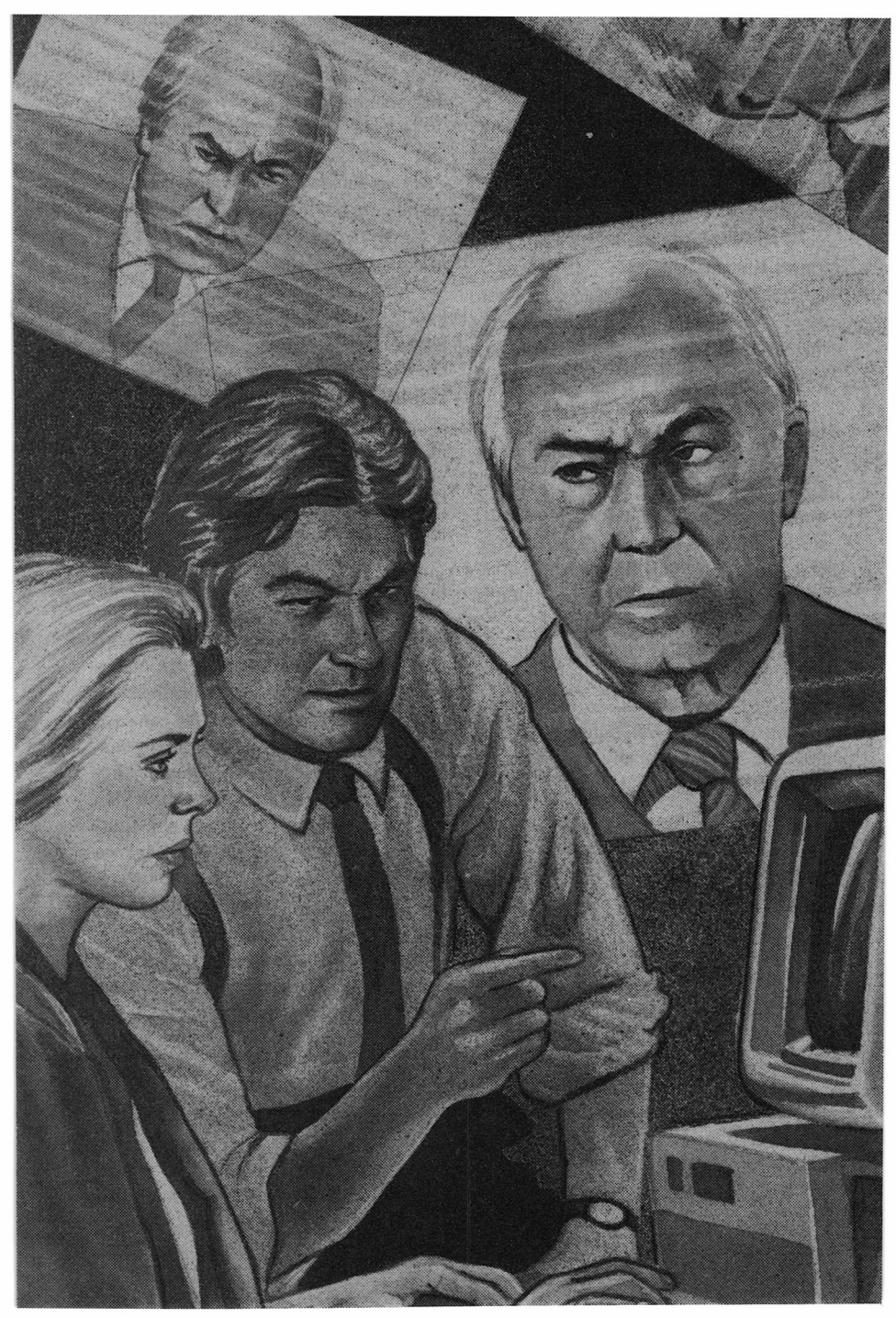
"First, I know my father better than any living person. That makes me ideally qualified to judge the accuracy of the simulation. That is why Mr. Campbell encourages me to experiment whenever I come by. Second, my investment in this project is more than just money, or even my library of my father's broadcasts. I believe in what Mr. Campbell and his associates are attempting.

"Has it ever occurred to you that death wastes the greatest brains our world has ever produced? That our finest thinkers, our greatest statesmen are cut down when their experience makes them the most valuable? With this system we can halt that waste! We can save that resource by preserving their wisdom and experience. Their personality simulations can continue even after they are gone; growing, learning, constituting the most precious resource our race has."

"No," I said, "it never had occured to me."

She was silent a moment, then shifted in her seat to face me and took a tighter grasp on her purse.

"Dr. Carpenter, this is personally painful to me, but let me give you an example from my own life. I married John over my father's objections. To get away from him, I see now. It was the only time I ever went strongly against his wishes and, believe me, I have spent



years regretting it. After his death and my divorce, I was left with a fairly substantial sum invested in a number of ventures. I haven't done badly with the money, but I do not have my father's acumen. If I could get the benefit of his experience, it would be tremendously valuable to me."

"I see," I said noncommittally, and carefully concentrated on merging into the freeway traffic.

"There is another thing, too. As you may have noticed, I still have strong feelings about my father. While he was alive, I was never able to finish certain issues with him—bringing them to closure, as my therapist says. With an adequate simulation of my father, I'd be able to work through these things, to tell him the things I never had a chance to tell him."

"With a machine?"

"The point is the effect on me, not the presence or absence of the other person. Many therapists use role-playing to accomplish the same thing. I have discussed the matter with my therapist, and he agrees it would be beneficial."

*Your therapist never saw you with that computer,* I thought.

I dropped her at the country club and then headed back down the freeway. I needed advice of several sorts before I talked to Ionelli again and the logical place to start getting it could be found down in the rabbit warren of high technology firms in the Valley. A couple of quick calls on my car phone and I had a meeting for early afternoon drinks with Moshe Edelman, sometime dealmaker, full-time newsletter publisher and over-time yenta. In a town that runs on gossip and rumor, Moshe's is the freshest and best.

Our meeting place was a fern bar in one corner of an industrial park. The hanging plants inside were as green and lush as the lawns outside, but it wasn't from the light they got in there. I banged my head on the pots twice before I spotted Moshe's distinctive pear-shaped profile hunched over a tiny table in a nook off the bar. It wasn't yet three P.M., but I ordered anyway.

"Thinking of investing in this thing, Jase?" Moshe asked when I asked him about Woodrow Campbell and PerSim.

"Possibly."

"He'll drive a hard bargain," Moshe said. "That boy, he's sharp."

"A hard bargain, but an honest one?"

"I never heard anyone say he wasn't honest."

"But you wouldn't call him honest?" I countered.

Moshe played with the stem of his wine glass. "Look," he said, keeping his eyes fixed on the little beads of moisture on its outside. "I don't know anything, right? I've never dealt with the guy. But I'm not sure I'd want to."

"Why not?"

There was a burst of shouts and loud talk from the happy hour types at the bar as one of the regulars came in. When it died down, Moshe answered.

"Just a feeling. That and some half-rumors about why he left Technosystems."

"Under a cloud?"

"Nothing so heavy. But a very strong impression that some of the stuff he'd done there left a bad taste. If he'd hung in a little longer he might have left under a cloud."

Moshe took a swig of his wine before he went on.

"Look, you know how this business is. It's for the hard chargers, the workaholics. You go in with your energy level high and spend fourteen hour days getting the latest whiz-bang into production, or grabbing more market share, or whatever. Then next year there's a new whiz-bang and you get to do it again.

"And it's always for the big score, the equity position in something that's gonna go public and make you a multimillionaire with your picture on the cover of *Business Week*.

"But it's a young man's game," he said in a lower voice. "Come the fifth or tenth whiz-bang and you start slipping. The edge isn't there any more, you know? You begin to see that maybe you're not gonna make it. Maybe you're not gonna get the big score. And if you don't what have you got? Nothing. Your house is mortgaged so you could buy into your latest venture. Your BMW's leased. You're nothing and you're never gonna be anything."

Moshe looked over at the laughing, happy people at the bar. The bright, brittle ones in their twenties who still knew they were going to make it. Ebullient, expansive Moshe suddenly forlorn and lost in the world he had helped make.

"Anyway," he sighed, turning back to me and taking another mouthful of wine, "anyway that hits different people differently. Some don't figure it out until they're already over the hill, some burn out quietly, some have the sense to change. But some," he waggled his finger, "ah, some see it coming and they get desperate. They start to cut corners. They get real sharp. People like that you don't want around."

"And that's Campbell."

Moshe nodded and drained his glass. "That's Campbell." He sat sad and silent for another instant and then stood up abruptly. "Hey, look, Jase, I hate to drink and run, but I got to go, ya know? I got a client to meet." He waved me to silence. "No don't bother, I'll get the tab." With that he grabbed the check and headed for the door.

After he left, I sat for a few minutes, sipping the last of my wine and thinking. What Moshe said reinforced my impression of Campbell, but it didn't make him a crook. Perhaps his desperation only made him willing to take a chance on a flake like Schultz. It was entirely possible that the whole deal was completely legitimate. Perhaps I should be considering how to get a position in PerSim.

Then I thought of the way Janet Anderson looked when that computer talked to her and my wine turned to vinegar. Even if PerSim was completely legitimate, it was wrong as hell and something down deep told me it wasn't at all legitimate.

It was a short drive from the restaurant to police headquarters. It took me longer to find the right cop once I got inside.

The right cop turned out to be Sergeant Edward G. Ortega—slightly potbellied, with thinning hair on top and going gray on the sides, a rough brown face marked with a sprinkling of moles and sad bloodhound eyes that looked as if they had seen all the rottenness there

was to see in this world. When I walked in on him, his coat was off, his tie loose and his shirtsleeves rolled halfway up his forearms. He leaned back in his chair while he listened to my story and his face never changed expression.

"You've seen this thing, Dr. Carpenter," he said when I finished. "What's your opinion?"

"Well, AI isn't my field . . ."

"I'm not looking for expert analysis. I just want to know what you think."

"I'm not sure," I said at last. "I'm just not sure. It seems fantastic, but four or five years ago so did the things we take for granted today."

"You're suspicious, though?"

I nodded. "I know for a fact that damned thing has an unhealthy effect on some people. Maybe because of that I want it to be a fake. And there's something about that demonstration that keeps nagging at me. I could swear I saw something, but I can't for the life of me figure out what it was."

"Hmmpf," Ortega said. "So what do you want me to do?"

"I don't know that either. This whole thing seems so . . . so immoral. Like someone has invented a new vice, a legal kind of heroin, and is out there on the street hooking people on it."

"Dr. Carpenter," Ortega said shaking his head sadly, "there is no such thing as a new vice. Only the old ones slightly dressed up."

"You're not interested, then," I said, standing up. But Ortega shook his head and motioned me to sit down again. Then he did nothing but purse his lips and scowl off into space.

Finally his eyes focused on me again. "Dr. Carpenter, you're apparently a responsible citizen, and you're just about the only technically knowledgable outsider who's seen that thing. I'm going to trust you by telling you some things you have no business knowing. I'm not going to tell you what I'll do to you if you spill this, because I know you won't. Fair?"

The way he said the last part made me damn sure I didn't want to find out what would happen if I spilled anything. "What do you want in return?" I asked.

"A little cooperation and maybe some information sharing. I'd like you to keep up the contact for a while and see what you can learn."

I was going to do that anyway. "Fair enough," I said. "Now, what's going on?"

Ortega leaned forward and rested his elbows on the desk. "The fact is, I'm very interested in PerSim, Campbell and Schultz. On the basis of what we've learned, I think PerSim stinks to high heaven, but," he said with a shake of a finger, "so far we've got nothing we can even use to justify putting men on it. Right now PerSim is what you might call a hobby of mine, nothing else."

"You mean you can't even investigate?"

"So far, we have nothing to show that PerSim is anything other than a perfectly legit start-up. Campbell has complied with the reporting requirements, PerSim's prospectus has been approved by the Secretary of State's office, and most importantly, none of the investors have complained. PerSim is risky, but Campbell doesn't hide that and there's nothing illegal about risk, especially in this town.

"You sound like you're trying to convince yourself."

Ortega scowled. "Personally I'm convinced the damn thing is as crooked as a dog's hind leg. Everything I've learned since I started working bunco tells me it stinks!"

"And that's not good enough?"

"Besides the chronic manpower shortage, there are a couple of other problems with this one. First, Campbell is squeaky clean. No record, nothing but a couple of garden-variety lawsuits. A lot of bunco is intent and the lack of record makes intent hard to prove.

"Second, they don't like lawsuits in this department. If I started an investigation and word leaked, Campbell could sue our asses and probably win. That kind of thing will ruin a new company.

"Oh and there's a third thing. Your girl friend isn't the only one who's got money in PerSim. Some of the others have clout and they wouldn't take it kindly if we went after their candyman without a damn good reason."

"So a million-dollar fraud may be happening under your noses and you can't do anything?"

"Try a six-to-eight million dollar fraud," Ortega said grimly. "That's my best estimate, anyway."

"My God, that makes it one of the biggest private financings in the Valley in the last year!"

"Yep."

I didn't say anything for a long time. "I don't know which is worse. If this thing works or if it doesn't."

"If it works it's at least another squad's problem," said Ortega. "Narcotics maybe. Or maybe Ionelli's relatives would want in and that would make it OC's problem."

"Huh?"

"OC—Organized Crime. They've got quite a file on the Ionelli family."

"You mean John Ionelli is a mobster?"

Ortega shook his head. "Not that I know. But he has some real—ah—colorful relatives." He stopped and considered. "You know, maybe that's the ideal solution. John Ionelli gets throughly ticked, goes to his family and Campbell, Schultz, and their damned box all wind up at the bottom of the Bay."

*Great,* I thought as I walked out into the parking lot. *This morning I was a respectable businessman. Now I'm mixed up with the Mob, mechanical ghosts and possibly a multi-million dollar swindle. What next? Russian spies?*

"Next" was a depressingly normal morning of long-distance calls sandwiched between two conferences. It was almost noon before I got the chance to see Willard Schultz.

Schultz lived up toward Los Gatos, in a house set back from the road on a lot choked with a wild tangle of eucalyptus and oleanders. The trees and shrubs in the front yard showed fresh scars from enthusiastic but inexpert pruning and the roadside lot line was marked with a big pile of trimmings. From the back came the sound of a chain saw. I waded through the knee-high grass, and picked my way down a path wedged between the house and a house-high oleander hedge into the back yard. There was Schultz, ponytail peeking out

from underneath a hardhat, his glasses covered by a face shield, wielding the saw.

The popular press to the contrary, there are very few nerds in the Valley any more. Expensive contacts have replaced thick glasses, the studied casual look is more common than dirty white shirts and California cuisine is more popular than junk food and soda. Skinny is still in, but even the wimpy looking ones are likely to be marathoners or triathletes.

Willard Schultz was the exception that proved the rule. Even while he worked in the yard, he carried a pocketful of felt-tip pens in every color of the rainbow and as I came closer, I knew he didn't bathe regularly. I didn't get too close. Not because of the smell, but because he didn't look like he knew what he was doing with the chain saw.

According to his reputation, Schultz was an exception to the Valley norm in another way too. He was a flake; undependable. The guy was brilliant, but brilliant is the ground state around here. He just couldn't be counted on to complete a project.

"Mr. Schultz?" I shouted to be heard over the snarl of the saw. "Mr. Schultz?" I said in a lower voice as he turned and killed the engine. "My name is Jason Carpenter. I'm an investment advisor and I'd like to talk to you about PerSim."

Schultz turned back to the chain saw. "Talk to my partner, he handles the money."

"This isn't exactly about money."

Schultz shrugged. "So? The technology's proprietary. I've got nothing to say."

I decided to go for the easiest target: his vanity.

"No, I just wanted to meet you. I saw your prototype yesterday and I'm extremely impressed. It must have been a hell of a job developing that personality simulator."

Schultz hesitated. "Yeah, it was a hell of a job," he mumbled.

Mentally I frowned. That wasn't what I expected at all.

"You must be very proud of what you've accomplished," I bored on.

"Sure, proud," he said, fumbling with the saw, trying to get it restarted.

"Do you feel you've vindicated yourself?"

"Vindicated?" he scowled up at me.

"After all those years of people saying you couldn't be counted on to finish a project, calling you a flake."

"The hell with them and the hell with you too, buddy! I did the hard parts, the creative parts. Because I wouldn't waste my time on the rest, they'd bring in some team player with a button-down mind to tromp all over my code in the name of 'structuring' it."

"It must be nice to know you've beaten them all at last."

"You know what's nice? Having money is nice. Knowing I'll never stand in another food stamp line. That's nice. This house is nice. And I got it all with the money from PerSim. That's real nice!"

"Sure," I agreed airily, "money's nice. But tell me the truth. Won't the real thrill come when you can show off the code? When it gets out there and people can finally open it up and see what you did. When people see what Will Schultz really did."

"Yeah, well that's a long time off," said Schultz hesitantly. "For now I'll settle for the money."

"So it is a fraud," I said quietly.

"What?"

"You know you're never going to show it off because it isn't even close to what Campbell says it is. You'll settle for money because you know if anyone ever sees that code you're going to go to jail."

"Goddamn it, it's not a fraud! It just needs more work."

"On the inference engine?" I shot back. "The rule-based system?"

"We'd be a lot further along if Campbell hadn't insisted I spend all my time on that damn speech synthesis module," he said defensively. "That and the discrimination response rules. Sure there are a few more modules to write, but it's real."

"How many more modules?" I bored on. "Half? Three-quarters?"

Schultz hesitated and then crumpled. "About 25 out of 38," he admitted.

"That's not going to save you, you know. Campbell's been passing that thing off as an almost-completed prototype. It wasn't, you knew it and you kept quiet."

"Goddamn it, if people want to sink their money into something like that, it's not my problem! It's been done lots of times before. I've seen it."

"No," I shook my head. "This time you're not just one of the hired help. And it is your problem, because when this comes out, you're going to jail."

"I told him he was pushing too hard" Schultz mumbled, "going too fast, but he wouldn't listen. He just wouldn't listen."

"Look," I said sympathetically, "I know you probably got involved innocently, but about your only chance is to go to the police. There's a man down at headquarters, Sergeant Edward Ortega. Talk to him. You can't keep this quiet much longer, you know."

"Shit," Schultz said, and put down the saw. "Yeah, You're probably right." He looked up at the house. "Shit." He said again.

On my way back to my office, I called Ortega on the car phone. He wasn't in and I left a message. Almost as soon as I got back, John Ionelli was on the line for me—the third time that morning, according to the messages on my desk.

"Where the hell have you been?" he demanded by way of opening. "And what have you found out?"

I gave him an edited version of events so far, leaving out Ortega's suspicions and toning down my talk with Schultz.

"So the goddamn thing is a fraud?" he cut in before I finished.

"Um, I don't know that yet," I temporized. The last thing I wanted was to be responsible for a confrontation between Ionelli and Campbell.

"But you think it is, right?"

"I'm not sure."

"Well, I am," he went on, voice rising. "I've seen what this, this personality thing is doing to Janet and I won't stand for it! I won't let them do this to her!"

Sometimes life's timing sucks. I had just opened my mouth to try to calm him down when my secretary put an urgent message on my terminal.

"Look, Mr. Ionelli, I've got a call coming in that I've got to take. Promise

me you won't do anything until we've had a chance to talk some more. We can settle this thing, I'm sure."

"Well . . ."

"Just don't do anything, okay?" and with that I broke the connection.

My secretary's instincts are excellent even if her timing is terrible. The urgent call turned into a four-way haggling session with New York, Austin and Los Angeles. It took two hours to convince the developers they didn't need as much additional money as they thought they did and to warm up the investors' rapidly cooling feet. In that time, Ortega returned my call. Then I called him and left a message.

The upshot of this telephone tag was that it was about 3:30 by the time I talked to Ortega. That meant it was a little after 4 P.M. when Ortega got to Schultz's house and just after 4:15 when Ortega called me back.

"Did you talk to Schultz?" I asked as soon as I picked up the phone.

"No. But I want to talk to you. Can you come up here right now?"

"I suppose so. Why? Won't Schultz talk to you?"

"Yeah," Ortega replied. "You might say that."

Willard Schultz wasn't talking to Ortega or anyone else. Not ever again. When I got there he was lying on his back in the grass and weeds under a large tree, his dirty white shirt splashed a dark sticky red and a big tree limb covering what was left of his face. The chain saw was next to him and the earth was badly scuffed where it had bitten into the ground still running. The police were measuring and photographing and doing whatever else it is they do and Ortega was standing to one side with his hands thrust into his pockets, looking even sadder than usual.

"What happened?" I asked as I came up to him.

"It looks like he was trimming that tree and had an accident," Ortega said.

"Yeah. When I saw him this morning I thought he didn't know what he was doing with the saw." As we watched, two police officers lifted the limb off. What was underneath wasn't a pretty sight, but that wasn't what shocked me.

"Hey wait a minute! Was he wearing a hard hat?"

"A hard hat?"

"Yes. When I talked to him this morning he was wearing a hard hat." I looked down at Schultz's hands. "And gloves. He was wearing gloves."

"No kidding?" Ortega seemed only mildly interested.

"Don't you see? If Schultz had really been using that saw he would have had the gloves and hard hat on when he died! But he wasn't."

"Which means it's a clumsy attempt to disguise a murder as an accident. We know that already." He made a face. "Do you think I would have dragged you out here on an accidental death?"

"But how did you know?"

"Hell, lots of things. The way the body is lying, the angle of the tree limb. It's hard for an amateur to make a death look like an accident, but they never stop trying. Too much TV, I guess.

"Now," he said, cracking his voice like a whip. "Who else did you tell? Who knew you'd talked to Schultz?"

"Just you . . . and . . . and John Ionelli." I had a sudden vision of that

handsome face contorted in rage, the muscles bulging under the open-throat shirt as he swung that tree limb like a baseball hat, connecting right across the bridge of Willard Schultz's nose. The picture was all too real.

"When did you talk to him?"

"Just a few minutes after I called you the first time."

"So he would have had plenty of time to get up here and finish Schultz off. Coroner isn't done yet, but I'll bet he's been dead about two hours." He looked around again. "Well, I can't do much else here. Come on. I've got a tape recorder in the car and I'll take your statement here.

As we walked out to the road together I wished devoutly the next thing had been Russian spies.

When we got out to the street my car phone was ringing. I ignored my first impulse and answered it.

"Dr. Carpenter, this is Janet Anderson," her voice was tight and breathless. "I can't reach Mr. Campbell and I don't know who else to call. I just heard there was an accident of some kind and Willard Schultz has been hurt. Do you know anything about it?"

Ortega and I exchanged looks. "As a matter of fact he has been hurt, Ms. Anderson," I said. "But why did you call me?"

"I told you," she said impatiently. "I can't reach Woodrow and I thought you might know something since you are an acquaintance of John's."

"So?"

She hesitated. "John is the one who told me."

After she hung up, Ortega motioned me into my car.

"Come on, I want to talk to Ionelli."

"With me? Why?"

"First, because I didn't bring my car and the detectives I'm with won't be done for another couple of hours. Second, he knows you. He doesn't know me. I want some quick answers, not a waltz with his lawyer."

"Won't it hurt the investigation if you question him without his lawyer present?"

"Dr. Carpenter," Ortega said tiredly, "just get in the car and quit trying to play detective."

Ionelli's office was in a warehouse down by the tracks. Most of the building was taken up by his family's produce business. To get to him we had to pass several large individuals who looked both tough and competent. They also looked like they knew Ortega's profession and didn't approve.

Ionelli was at his desk, coat off, working a calculator with one hand and riffling through a stack of papers with another. He made a quick note of the number on the calculator display before looking up.

"Have you got anything more?" he growled at me. "And who the hell is he?" Obviously Ionelli didn't bother with yuppie manners on his home turf.

"Ah, quite a lot more," I said. "This is Sergeant Edward Ortega from the fraud and bunco squad. He'd like to talk to you about PerSim."

Ionelli nodded. "Are you going after those bastards?"

"We're conducting an investigation," Ortega replied. "Mr. Ionelli, where were you this afternoon?"

"Right here, checking invoices."

"Can you prove it?"

"Sure. The foremen are in and out all the time."

Ortega's face showed what he thought of an alibi based on the testimony of Ionelli family retainers.

"Have you talked to your ex-wife today?"

"No. Look, what the hell is this?"

"Someone killed Willard Schultz this afternoon," I blurted. Ortega shot me a freezing look and I felt like an idiot.

Ionelli grinned. "No kidding?" Then he sobered. "And you think I did it, huh? Look, I'm not sorry the bastard's dead. But I didn't know it until you came in here shooting questions and I sure as hell didn't kill him."

"But you would have liked to kill him?" Ortega asked.

"I've said all I'm going to without a lawyer."

"Your ex-wife says you called her and told her Schultz was hurt," Ortega pressed on. "Now there were only three people who knew Carpenter had talked to Schultz: Dr. Carpenter, Schultz and you. Carpenter didn't tell her and Schultz sure didn't. Who's left?"

"Crap! I haven't talked to my wife all day. I didn't even go out for lunch. Now either arrest me or get the hell out of here." He bent back to his papers.

Ortega turned and walked to the door.

"Wait a minute," I said. "I didn't tell anyone else, but what do you want to bet that Schultz did?"

"Campbell?" Ortega asked.

"It would be logical, wouldn't it?"

"And Campbell would naturally try to talk Schultz out of it face-to-face."

"Yeah."

"Mrs. Ionelli's call?"

"Campbell. He's got her hooked good."

"You know," Ortega said thoughtfully. "If she tells that story to the police, she's going to be in big trouble."

"Huh?" Ionelli's head snapped up.

"At the very least it makes her an accomplice to murder and it might be enough to get her convicted of fraud too."

"Horseshit! Janet was suckered!"

"That might be hard to prove. She helped pull in other investors. If she lies to the police, it will look like was was directly involved."

"What can we do?" I asked.

"I think," Ortega said judiciously. "I had better have a talk with her before Homicide does. And I better have it before she has a chance to get together with Campbell."

"She should be at the country club," Ionelli said, grabbing for the phone.

Janet Ionelli wasn't at the country club, she wasn't at home and she wasn't at a couple of her other usual haunts.

"I've got a nasty feeling I know where she is," Ortega said as Ionelli slammed down the phone for the fifth time.

"PerSim?" I asked.

"Yeah, and if she and Campbell get the chance to get their act together she could be in real trouble."

"Come on," Ionelli urged. If she's coming from the club, we've got a chance of beating her to PerSim. Let's get the hell over there before that bastard sucks Janet in deeper."

Ortega looked at him. "I was thinking of doing this alone."

"To hell with that! Let's go."

"You're either staying here or you're

going downtown under arrest," Ortega snapped. "Now which is it going to be?"

"Neither, if you want to get to Janet before Campbell does. Come on, Sergeant. She's my wife."

Ortega glared at Ionelli and then shrugged. "Christ! Amateurs," he said disgustedly. "Goddamn amateurs everywhere."

It wasn't a pleasant trip. Ionelli insisted we take his car and he drove like a maniac, all the time pumping us for the story.

". . . so when Schultz's conscience got in the way, Campbell decided to knock him off," he summed up as we blasted through rush hour traffic.

"Probably not beforehand," I said, trying very hard not to look out the window. "You don't plan to murder someone by braining him with a tree limb. But with Schultz dead, he saw a way to end the scam very neatly. The secret of personality simulation died with Schultz, so obviously there was no way to go forward with the project and all the money was already spent. Sorry."

Ionelli whipped the car around a semi and the engine howled under the downshift.

"That slimy murdering scumbag. Of all the god-awful . . ."

"Slow down, Mr. Ionelli, Ortega urged from the back seat. "It's an old, old con. Fifty years ago phony mediums worked it by claiming to let people talk to their dead relatives. All this Campbell guy did was to update it with computers."

"But its so goddamn pathetic. Campbell's not just taking their money. He's playing on their pain."

"Mr. Ionelli," Ortega said tiredly, "a wolf can't afford to be concerned about the feelings of the sheep. Now will you please take it easy before you wreck us?"

We came barrelling across four lanes of traffic and hit the off-ramp with a puff of smoke from the tires. The engine howled again as Ionelli downshifted and the rear end slid dangerously close to the rail as he fought the car through the turn. Mercifully there were only two lights between the freeway and the PerSim office and they were both green.

"Oh shit!" Ionelli exclaimed as we roared into the parking lot. "That's Janet's car. She's already here."

"Do you think Campbell's had time to coach her?" I asked Ortega.

"Wouldn't take much. All she has to do is swear Campbell didn't tell her about Schultz and that they'd been together here long enough to establish an alibi."

"Well," Ionelli said grimly, "let's go see what she does say."

Janet Anderson-Ionelli was waiting for us in the outer office, sitting on the sofa with her hands folded primly in her lap and Campbell standing at her side. Their eyes widened slightly when Ionelli came charging into the room.

"Good afternoon, Dr. Carpenter," she nodded to me, pointedly ignoring her ex-husband. "Is there any more news on Mr. Schultz?"

"He's dead," Ionelli said.

"Oh dear," said Campbell.

"How dreadful," said Ionelli's ex-wife.

"You don't seem surprised," Ortega observed.

"Who are you?" Campbell asked sharply.

Ortega pulled out his badge. "Police."

"Ahh, uh, yes," said Campbell frowning. "Well, we were afraid that was it. We couldn't reach him and none of the hospitals listed him as a patient."

"Mrs. Ionelli . . ." Ortega began.

"Mrs. Anderson," she corrected.

"Ms. Anderson, you said your husband told you Schultz had been hurt. When did he tell you that?"

"He called me about 4 P.M."

"Your husband denies it."

"My ex-husband, please." She shrugged. "Nevertheless, he called and told me."

"Bull!" Ionelli barked.

"Mr. Ionelli, please! Now Ms. Ionelli, your husband—excuse me, your ex-husband—has witnesses who swear he never left his office this afternoon. So how did he find out about Schultz?"

"Just what are you suggesting?" Campbell interjected.

"I'm not suggesting anything. I'm asking how Mr. Ionelli could have known."

"For a man with his connections, I can think of several ways," Janet said coldly.

"And I can think of another," said Ortega equally coldly. "Someone else told you. Someone like Mr. Campbell."

"That's preposterous," she snorted.

"How would I know?" asked Campbell.

Ortega shrugged. "Maybe you went up there and found him after his accident. Maybe you had reasons for not wanting to admit that."

"As Janet says, 'preposterous.' "

"You're sure your husband is the one who told you? No one else?"

"Yes, I'm sure!"

"Please think carefully," I said. "This is very important."

"Dr. Carpenter," Mrs. Ionelli snapped. "I told you once I was not an incompetent. I am perfectly aware that my ex-husband resents any influence but his in my life. And it is now quite obvious that this man would like to advance his career by making a sensational arrest."

"Did it ever occur to you that they might be trying to help you?"

"I neither need nor want their help. Now please leave, all of you. This project has suffered a great setback today and I'm sure Mr. Campbell has a great deal to do."

Ionelli and his ex-wife glared at each other as if they wanted to add to the death toll. Campbell looked completely unruffled and Ortega just looked glum.

This was getting us nowhere. If something didn't happen fast, Janet Ionelli, or Anderson, or Anderson-Ionelli or whatever, would be so locked into her story Ortega could never shake her. The police might eventually nail Campbell—assuming he didn't skip first—but she would go down with him, at least for perjury and quite possibly as an accessory to fraud and murder. There had to be a way to shake her. Something to make her quit covering. There had to be something . . .

Helplessly, I looked from Ionelli to Janet to Campbell, and past Campbell through the open door of the inner office

where the computer that had caused this carnage sat on the desk. . . .

And with the proverbial blinding flash the thing that had been nagging at me for two days came into focus!

Mentally, I licked my lips and wiped my sweaty palms on my trousers. "Mrs. Ionelli . . ."

"Ms. Anderson," she corrected sharply without looking away from John Ionelli.

"Very well then, Ms. Anderson. Before you commit yourself, would you be willing to consult someone else on this matter?"

She turned to me, her eyes like bits of blue china in that perefect oval face. "I really don't see that it is necessary. This is a perfectly simple . . ."

"Would you be willing," I cut in, "to ask your father?"

Campbell's head jerked like a puppet on a string. Suddenly the only sound was the air conditioning. Janet ran the palm of her right hand over the back of her left.

"Just what is it you are proposing?" she said finally.

"You once told me that the personality simulator would let you draw on your father's wisdom and experience. If I may say so, I think you could use that experience now."

"You're suggesting she consult the computer?" Campbell asked incredulously.

"Why not?" I replied with all the blandness I could muster. "That is one of its functions, isn't it?"

"But the program's not finished!"

"As Ms. Anderson says, it's a perfectly simple question," I said with just a hint of a smile. "Surely the simulation is competent for that."

"Bull!" barked Ionelli. "The damn thing's a fake and we all know it."

Deliberate or not, there was enough reverse psychology in that to tip her over.

Janet Anderson slapped her palms on her knees. "Very well," she said, standing up, "I'll do it. Woodrow, will you please bring up the simulator?"

"Janet . . ."

"Woodrow," Janet said dangerously, "If you won't, I will. I've seen you do it often enough."

Campbell led the procession back into the inner office. With the four of us in there, there was barely room to move. A few quick commands on the keyboard and the red light winked on. He nodded and Janet started to thrust her way into the chair. I stopped her with an outstretched arm.

"Just a minute, Ms. Ionelli. Before you start in, there are a couple of questions I'd like to ask." Janet frowned and moved back as I dropped into the seat. I took a very deep breath and began to type.

ARE YOU THERE, MR. ANDERSON?

"Yes I'm here." Again that wonderful rich voice filled the room. I half believed that if I turned around I would see Winston Anderson standing in the door. I refrained and kept typing.

The question was, how far had Schultz gone with the thing? If it was what I thought it was, and if Schultz had done the job in the way I thought he had, I could make this work. Otherwise I was just wasting everyone's time.

MR. ANDERSON, I'D LIKE TO ASK YOU SOME QUESTIONS.

"Certainly, but call me Winston, please."

ALL RIGHT, WINSTON. HOW IMPORTANT IS THE TRUTH?

"The truth is vital. First, last and always we must have the truth."

EVEN IF TELLING THE TRUTH HURTS SOMEONE?

"Especially then," the voice rolled on, avuncular and gently chiding as Winston Anderson had chided all of America when he had been alive. "It is easy to be truthful when it is pleasant or harmless. The real measure of our character comes when we must face unpleasant or unpopular truths."

WHAT IF TELLING THE TRUTH LEADS TO INJUSTICE?

There was a long pause. "I'm not sure I understand you," the computer said in a puzzled tone.

By now I was sweating for real. Obviously that question had been too complex. I had to force the answer I wanted without breaking anything. If I couldn't get that answer, or if I crashed the program in the attempt, Campbell won.

SHOULD YOU LIE TO PROTECT SOMEONE?

"You cannot protect by lying," the great sonorous voice rolled out. "Only the truth, the full truth, can protect us. We must face our crisis squarely and honestly. We cannot do so by lying."

No one said anything for a moment. A long moment. I looked at Janet Anderson and she looked at the computer. Ionelli glared and Campbell fidgeted.

Finally she took a deep breath. "Very well. You're right. Woodrow told me what had happened to Mr. Schultz. He didn't call me from here. He called from a phone booth. Near Mr. Schultz's house, he said."

"Janet . . ."

"No, Woodrow. Father always stood for the truth." She turned to Ortega. "He asked me to say we had been here. He was afraid he'd be railroaded by John's family."

I exhaled the breath I hadn't realized I had been holding. "Well, I think that's enough."

"That's more than enough," said Campbell sharply. I turned and saw he had a gun in his hand, a little Saturday Night Special, but the muzzle looked big enough to hide in.

"Oh, Woodrow!" Janet Anderson said, shocked and disappointed.

"Just what the hell do you think you're doing?" Ortega asked. He seemed more disgusted than worried.

"I'm leaving. I'm sorry Janet, I really am. Believe me, I intended none of this."

"Oh, Woodrow!"

"Come along, Janet. I'll try to explain it to you as we drive." Janet Anderson-Ionelli sat frozen in the chair.

Campbell gestured with the gun. "I said come along!"

Being six-nine has disadvantages, but it gives me a remarkable reach. I lashed out with my foot and caught Campbell on the forearm. The gun bounced off the ceiling and Ortega and I both grabbed him.

With a roar, John Ionelli launched himself across the room, sending all three of us caroming off the wall onto the floor. Ortega and I both shifted from holding Campbell to trying to keep Ionelli away from his throat. In the confusion, Campbell wriggled free, staggered to his feet and spun out the door.

"Shit," said Ortega conversationally as we untangled ourselves. Outside a

car roared to life and screeched out of the parking lot.

"He's getting away, goddamn it!" Ionelli shouted.

"Not likely," Ortega said. "Where's the phone?"

"In the outer office," Janet said, white and shaking.

We stood there for a couple of minutes. Ionelli pulled moodily on a cigarette and I flexed my foot trying to convince myself I had just bruised it. Through the door we could hear Ortega giving the police dispatcher Campbell's description.

"So it really was a fake," Janet Ionelli-Anderson said finally. The cool ice princess, only a little paler than usual. "It was just a hoax." The extra whiteness of her skin made the makeup on her cheeks stand out more vividly. As if she'd been slapped. "How did you know?"

"Campbell claimed this computer was only acting as a terminal for a bigger computer," I told her. "But it obviously wasn't. See that little red light on the front of the machine? That's the indicator for the hard disk drive. Every time you entered something, the light would come on, meaning the computer was getting something off the disk. If all the computing was done remotely, there was no reason for that."

"Perhaps he said he was using a big computer to maintain secrecy," Janet put in. "You know, sow confusion."

"If that's so, what happened to the money supposedly spent on computer time? And if the program wasn't what Campbell said it was, then what could it be?" I sighed. "Once I asked myself that the answer was depressingly obvious." I leaned back against the wall and stretched my legs out to get some of the tension out of them.

"One of the problems with AI is so many of the obvious approaches are blind alleys. They give astounding results, and then they hit dead end. You've heard of Eliza?"

"The program that acts like a psychotherapist?" Ionelli said. "Yeah. I saw it at a party once. It was really something."

"It's a classic dead end. Essentially it was a mechanical multiple choice system. Feed it an input and it chooses the correct response from a list supplied by the programmer. It was so impressive it still gets mentioned in nearly every popular article on AI. But it was futile; it led nowhere."

"Why not?" Ionelli asked.

"For one thing, program size grows exponentially as the program's responses get more realistic. There are a number of more sophisticated problems as well.

"Schultz told me the hardest part of the project was getting the voice right. I'll bet when we examine the code we'll find an advanced Eliza-type program with a much bigger vocabulary and more complex response patterns—patterns that could be programmed to match the responses of a real person."

Ortega came back in the room. "We got him," he announced.

"Where?" asked Ionelli.

Ortega looked disgusted. "About three blocks from here. He tried to take a corner too fast and ran into a light pole. Amateurs. Goddamn amateurs!"

"But the program really talks like my father!" Janet protested as if we hadn't been interrupted. "And it makes sense! It doesn't just parrot phrases."

"No, Janet," I said gently, "it is just a parrot. But it's a parrot with a lot of complex rules governing when and how and in what combination it parrots. Remember that most conversations are only variations on a number of stock comments and stereotyped responses. Besides, Campbell could always explain the program's deficiencies by saying it was a prototype—and needed more money to develop."

"He did," Janet said in a small colorless voice.

"Jesus," said Ortega. "What a racket."

"Come on honey, I'll take you home," Ionelli said as he put his arm around his ex-wife.

Janet reached up and gently removed his hand from her shoulder. "No, go on, John. I want to stay here for a while." She pulled the chair up to the computer.

"Come on Janet," Ionelli said gently. "Leave it. It's a fake."

"I know," she said softly, "I know." But she didn't move.

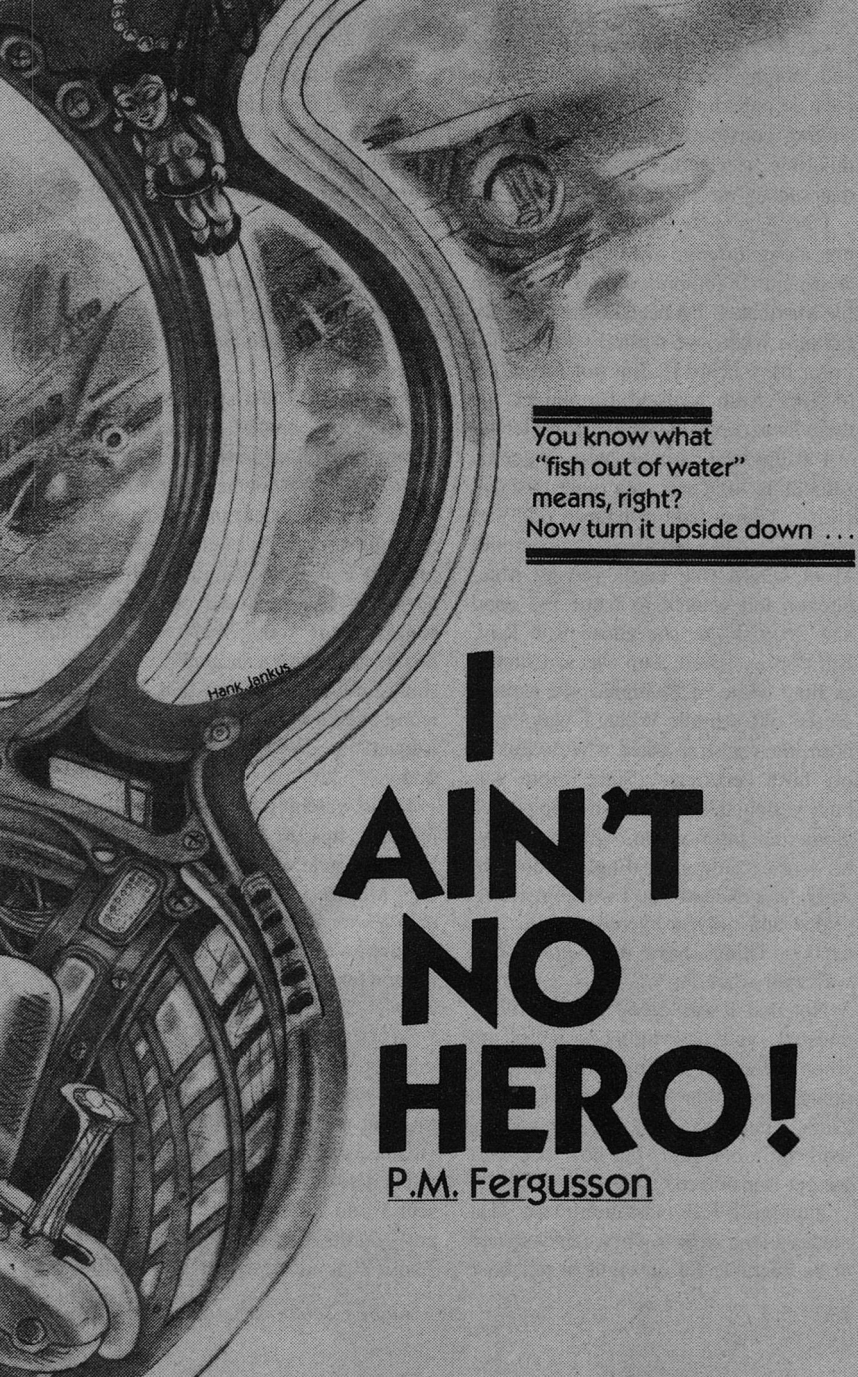
"Janet, please!"

Janet Anderson-Ionelli spun away from him to face the wall, her fists clenched. "Leave me alone, goddamn you! Go away and leave me alone!"

Ionelli moved toward her, but Ortega put his hand on his shoulder and shook his head sadly. Ionelli slumped and turned to the door.

As we filed out, she sat down at the computer with the final, fatal message still glowing gold on the screen. When I ducked to go out, I saw her adjust the keyboard.

I didn't meet Ionelli's eyes all the way home. ■




You know what
"fish out of water"
means, right?
Now turn it upside down ...

# I AIN'T NO HERO!

P.M. Fergusson

I was feeling good, looking for dinner and singing. Now some persons have been so unfeeling as to suggest that my singing constituted felony assault, but this time, it was the looking for dinner that sucked me into trouble.

I was easing *Dr. Fu Manchu*, my subtug, along the edge of Michaelmas Reef at around six fathoms when I picked up the Mayday. If I'd been down at twenty fathoms where we normally cruise, I'd never have heard it. But not me; I had to have fresh seafood for dinner, so there I was, up in the surface turbulence.

I suppose I should have expected something to screw up a quiet two day cruise. Things tend to happen oddly in my family—like my name, for example. Mom was a true tartan-waving MacGregor and wanted to name me good and Scottish, so she chose Rob Roy. But Pop . . . well, Pop was as Chinese as they come, a Shanghai sea captain of the old school. When I was being born, the registrar asked what to put on my birth certificate. Since Mom was busy yelling the walls down, Pop passed along the information. Unfortunately, he doesn't pronounce English too well when he's excited—so I was registered, sealed and duly delivered as Lob Loy Chang. Things have been going that way ever since.

Not that I was doing anything very unusual, you understand. I never am when these things happen. What I was doing was going from Port Alberti to Zinja. Harbor daisies like *Fu* usually work only one port, but now and then we get transferred.

Subtugs of *Fu*'s class aren't fast. That means a long slow trip in a can designed to be bearable for an eight or ten hour work shift. Ergo, we run high where we can open a hatch and stretch if we feel like it—and the weather permits, which it usually doesn't. We also tend to take a break and fish for supper if the opportunity presents—and Michaelmas Reef definitely presents. It's gorgeous to look at and stocked like a gourmet restaurant, if you don't mind being the chef. And for once, the weather was on my side. Everything was perfect—I thought.

Anyway, I'd just spotted this pleasantly plump bagfish waddling along among the spikefronds, when the damn radio woke up—not the sonar, the radio.

On Tenifre, where the most economical and safest way to get from point A to point B is fifty fathoms down, ships normally communicate on ultra-band sonar, but if you get above a certain depth, wave action and turbulence make sonar unreliable, so you stick up an antenna and monitor the secondary radio frequencies. Which is just what I was doing.

I was watching the bagfish and licking my lips in anticipation when a husky, female voice announced, "Mayday! Mayday! Mayday! This is Transitship Victor Zulu One Niner Zero Eight on unpowered descent over the Wellington Sea. Any vessel please acknowledge!"

My first reaction was irritation. Bored radio operators sometimes play tasteless jokes, but this was going a bit far. Putting out a phony Mayday out is prosecutable, and this one was just too farfetched to be real. T-ships do not descend into atmosphere, at least not in any condition to put out distress calls. Those rigs are designed to run from a

low orbit passenger terminal to a high orbit star-ship and back—and that is all. They may *look* like the station-to-surface ships, but they aren't stressed like them. About the closest a t-ship gets to atmosphere is when they pull skips—dropping from high orbit and ricocheting off the atmosphere to reach a station half-way around the planet.

I was about to tell this yahoo what I thought of her gag when something about the voice made me hesitate. Panic, real seat-drenching terror, is hard to fake—and this voice had that intense, forced calm that says somebody is in deep hoo-hoo.

My comm unit doesn't know about skepticism, so it automatically started tracking the signal's source and feeding DRT data to my on-board. The plot showed the source as being just where it claimed: forty thou and dropping—right along the trailing edge of a storm line.

On Tenifre, storms are something to be respected. They're one of the reasons most travel is underwater. In terms of communication, it meant that if nobody else answered that distress real soon, then I was the only one who could hear it.

I counted twenty and blew a kiss at my ex-dinner-to-be as it waddled placidly into a crevice in the reef. "T-ship calling 'mayday,' this is the submersible tug, *Dr. Fu Manchu*." I gave my planetary coordinates and asked for status.

The reply came back fast and sarcastic. "*Fu Manchu*, this is t-ship Victor Zulu One Niner Zero Eight. My status is shit. I'm in a dead-stick glide and I'm going to have to set this motherless piece of crud down in the middle of the ocean—where it will most likely proceed to do a fair imitation of a ninety ton anchor. If I had a null-grav belt, I'd bail the hell out of this lead balloon. *That's* my status. What are the sea conditions?"

I have to admit that I'm not real fond of female pilots. They tend to be bossy and look like . . . well, they tend to be less than attractive. One that sounded like a baritone probably looked like one. I shrugged. I wasn't supposed to be judging a beauty contest, I was supposed to be supplying critical information.

"Two foot, long period swells out of the northwest. Wind is dead calm. Bring it in from the northeast or south-west and it should be like setting down on a paved runway."

Now *that* was a bright thing to say to a someone flying a disabled t-ship.

At least the lady pilot had a sense of humor. "*Fu Manchu*, the last time I set anything down on a paved surface was four years ago, and the only thing this pile of bolts would do with a runway is make a big hole in it." There was a long pause, then she added in a very unhappy voice, "I'll give it a try from the southwest—not much choice."

"Keep it high," I warned, "until you clear my location. You'll be coming in over a reef, and that would *not* be a good place to set down. There's less than a fathom of water over the top in some places."

"Marvelous! I'll do my best. The way this mother is settling, I may not even be able to *make* the reef."

I hoped she was being overly pessimistic. If the t-ship didn't clear the reef, I'd have a hundred kilometer plus trip to find a gap and get back to it. "Keep

transmitting," I said. "It gives my comm something to track." I tried giving her something to talk about. "Are you freight or passenger?"

"Passenger. Sixty tourists and five crew aboard."

I had to ask.

I decided to try the optimistic approach and assume the t-ship wasn't going to disintegrate into a few thousand bits and pieces as soon as it kissed the first swell. "How long will that thing float?"

"Depends," came the reply. "If it stays together, between fifteen and thirty seconds."

Do what! "I thought you guys have big tanks of oxygen and some such for fuel. Can't you blow those for buoyancy?"

"They're blown all right. As soon as I hit the atmosphere. That's why I'm in this mess. The damn emergency went screwy and dumped the tanks when we skipped. No tanks, no fuel, no power to push back up. We kept right on skipping."

"But the atmosphere in the cabin," I protested.

The lady's reply was understandably irritable. "Man, do you realize how much junk they hang on one of these things? There's thirty tons of garbage just to keep the passengers happy. Plus all the shielding and stress members to keep us in one piece when we skip. This thing is headed for the bottom as soon as it loses momentum."

That made the situation a bit different. On this side, the reef dropped damn near straight down into three hundred fathoms. Even if the pressure didn't make a pancake of them, they'd starve or suffocate before a deep-rescue vehicle could get here. I got back on the horn. "You're going to have to put it down on the west side of the reef, the east side is too deep. The water on the west should be almost flat calm. When you pick up the surf line on the reef, turn north and parallel it. You'll see a calm area where the reef breaks about sixty kilometers north of my present position. Try to get as close to that as you can. See if you can stay about a hundred meters west of the surf line. That should put you in about ten fathoms—twenty meters—of water. If you get on this side, you're gonna be in real trouble."

"You mean I'm not already? . . . Sorry, *Fu Manchu*. I'll do my best. We are now about six minutes from touch down."

I turned and headed north for the gap. The *Fu* can make twenty knots submerged and six on the surface. I got ready to pull the plug. One last thought struck me. "T-ship, will that comm gear of yours work under water?"

"If it doesn't short out, it should."

I hoped it wouldn't short. If it did, I was going to have a hell of a time finding that ship. I left the antenna up and took Fu down to ten fathoms. I needed speed, but I needed to hear, too. I tried raising some help on the sonar. Naturally I got nobody. The baby was all mine. I started praying that I could deliver it.

"*Fu Manchu*, I have the reef and the gap in sight. I'm not going to get as close as you wanted. I'm turning parallel now. Touch-down in twenty seconds about half a klick off the reef and north of the gap."

Silence.

And that, as they say, was that. I pulled the antenna, pushed *Fu* down to twenty fathoms and fed throttle till the deck plates rattled and the hull started making unhappy noises.

An hour later I cleared the gap and started calling. To be honest, it was a gesture more than anything else. The radio will work under the surface, but the range is lousy. Not that I figured it mattered. If they hit in water deeper than they could swim to the surface, I was betting it was all over anyway. I judged the chances of the t-ship staying in one piece after the kind of beating it had taken at zero.

I damn near fell out of my chair when I got an answer. I couldn't get much intelligence out of the signal, but I could follow it.

As the signal picked up strength, I made out that it was an emergency homing beacon. That I didn't like. But then again, maybe they were just saving their breath. After all, there was no way they could know exactly when I'd get to them. I decided to wait until I had them spotted before I tried calling again.

When I did find them, I damn near didn't bother with the call. They were sitting on a flat bottom, apparently upright, in eighty fathoms of water. Twenty fathoms below the max depth *Fu* was rated for.

Yeah, I know the liners and the other big stuff run at a hundred fathoms or better. But *Fu* ain't no liner. You don't find many hundred fathom harbors, so why build a harbor daisy to go that deep? Now, twenty fathoms may not sound like much, but in terms of pressure it's a hell of a lot: the difference between breathing air and water.

What really startled me, though, was the fact that the t-ship looked like it was in one piece. A spacecraft is designed to take one atmosphere pressing outward against none. Where that ship lay, it was sustaining better than fifteen atmospheres pressing *in* against one. It should have been imploded into a twisted mess—but it wasn't. It was, however, showing the bubble trails of some kind of leakage. It might be in one piece now, but if those bubbles indicated a hull leak, it wouldn't be for long.

Then again, I might not be either if I went after it.

I did the logical thing; I yelled for help.

Amazingly enough, this time I got a response. "*Fu Manchu*, this is the Conrad liner *Spikefish*. That you, Chang?"

"Who the hell else would it be in this tub, *Spikefish?*"

"I thought somebody might have wised up and fired you, L.L. What's your problem; get stuck in a crack chasing mermaids?"

I knew that voice. "Igor, one of these days I'm going to amputate that lump on your shoulders and feed it to a Blood-eel."

"Goodness, aren't we hostile today?"

"Yeah. I got a real problem. Put that lump to work, will you. I got a t-ship on the bottom in eighty fathoms with sixty-odd people on board."

There was a long, long pause. Igor may be a cheap, sour dispositioned drink moocher, but he isn't dumb, and he doesn't panic in an emergency. The delay was him calling his captain and

anyone else he thought could be of assistance.

When he came back, he confirmed my thoughts. "L.L., the old man wants to know the condition of the t-ship and its passengers."

I knew he was going to ask that. I couldn't delay the inevitable any longer. I called the t-ship. I know it wasn't nice, but secretly I was hoping that I wouldn't get a response. No response would mean no survivors, and that would get *me* off the hook. I could mark the crash, say a memorial prayer and start looking for my dinner again. Assuming I could find my lost appetite someplace.

I had mixed emotions when a squeaky voice answered me. "Thank God! I wasn't sure if the comm was working. I can see the glow of your lights on the bottom. Where are you?"

"Above and to your port. I'm in contact with more help. They want to know your status . . . which reminds me, you're in eighty fathoms of water, I didn't think a t-ship's hull was strong enough to handle that."

The pilot's voice had a ripple of nerves in it. "It isn't supposed to be. I started boosting the cabin pressure as soon as we started sinking. And changed the gas mix. It's around eight atmospheres of helium and oxygen right now."

Helium/oxygen? "Helium? Where'd you get helium?"

"Our attitude controls, of course. Where else? My flight engineer disconnected the nitrogen and jury rigged the helium tanks into the air supply circuit. Gave us more available pressure, too."

Chagrin time again; even after twenty years, I still think Terran sometimes. Around Sol, helium is rare; here it isn't. With the Tenifre system's two outermost planets having oceans of the stuff, what else would they be using for expendable gas? Hell, we even export Helium all over the galaxy. Oh well, that explained why they hadn't imploded. It also explained the funny squeak in the pilot's voice—but that still left a hell of a pressure differential, and a lot of *other* questions. "Is the hull damaged? What shape are the passengers in? How the hell did you manage to get that thing on the bottom in one piece?"

"I flew it. Easier than handling it in atmosphere, actually; the denser the medium, the better it reacts. As to damage, we sprung one leak in the engine room, but being master deep water damage control experts, we got it plugged and shored."

The lady gained my respect, eighty fathoms deep in hoo-hoo and still making with wisecracks. But that trail of bubbles said that they'd either missed a leak or their damage control work wasn't holding up. "What about the passengers?"

"Two serious injuries and a bunch of minors. One of the stewardesses may have a fractured skull, and I've got an eight-year-old child that's comatose and probably has internal damage."

"Hang on, I'll get back to you."

I relayed the data to *Spikefish* and waited while they fed it on to the Navy.

"L.L., the Navy says they've got a deep-rescue unit on the way. It should be there in about seven hours. We should arrive in under three. Keep a grip on your sphincter, L.L.; help is on the way."

I eyed that bubble trail drifting up from the t-ship and hoped it would be in time.

I relayed the information and explained the situation.

"By the way," the pilot said, "I hate to keep using the ship name, I'm P. J. Palmer, who am I talking to?"

*Another set of initials! How about that!* It gave me something in common with the t-ship pilot, and made me feel rotten that all I could do was sit and wait. "L.L. Chang," I said. "And don't ask what the L.L. stands for."

"Ditto about the P. J.," came the reply.

We spent the next three hours in small talk and passing necessary data. Included in the former was the promise to go get drunk together when this was over. Not that I was terribly enthusiastic about showing up in one of my usual haunts with a lady who probably looked like a professional wolf-fish wrestler. It certainly wouldn't put any pluses on my reputation card. But what-the-hell, under the circumstances we were in, you say what you feel will boost morale. Besides, she *might* even be passably good looking.

"Fat chance," my logic sneered. "Why would a space-line break a century of tradition just to let lady luck smile on *you* for once."

It had a point. Anyway, it was a promise I was getting more and more doubtful about keeping. That bubble trail was definitely growing.

A massive grey shape loomed on my starboard, dwarfing both *Fu* and the t-ship. "Hiya, L.L.." Igor's voice came over the sonar. "What can we do to help?" Spikefish had arrived.

"Damned if I know. Can you get a grapnel on that t-ship? Or maybe connect an emergency lock to their port?"

"Hang on and I'll find out."

A few minutes later Igor came back with the bad news. "Captain says the emergency locks don't match. He's afraid that if he puts enough pressure on the escape tube to seal it, he'll crush the t-ship. Besides, we're at one atmosphere and we don't have a decompression chamber on board. Even if we could bring those people aboard, the bends would kill them. What we do have are emergency tow cables. We might be able to loop a couple of those cables under the t-ship and lift it, but we're going to have to surface, rig the cables, then figure some way to work them into position."

I eyed that ominous trail of bubbles again. "I don't think that hull is going to stand up until the deep-rescue unit arrives. Rig your cables. Maybe I can use the *Fu*'s waldos to maneuver them into place."

To cut the details, we spent the next hour and a half trying everything we could think of and none of it worked. The t-ship was settled in a meter of bottom guck and nosed up against some rocks. No way we could slide cables past the rocks and under the nose. Worse, when we tried pulling a cable under the t-ship's stern, the bubble stream increased alarmingly.

Somebody was going to have to try pushing a couple of holes under that t-ship to work the cables through. Guess who *somebody* was.

*Spikefish* was most understanding. "Captain Chang, this is Captain Nkodo. I want to assure you that I appreciate

your situation. The pressure could rupture your subtug's hull if you try reaching the t-ship. I want you to know that I'll back any decision you make."

Sure you will, I thought. If sixty-six people go squish and I don't try reaching that ship, I can start looking for a job cleaning spitoons. If I make the attempt and *I* go squish, you'll recommend me for a posthumous medal, and the company will dock my estate for what I still owe on the *Fu*.

God, how I hated this situation. I know there are safety factors built into subtugs, but . . .

I sure ain't no hero. Still, I didn't have much choice. I started easing *Fu* down toward the t-ship while *Spikefish* surfaced to unhook one end of each of the cables.

Easing? I took *Fu* down at about a centimeter a second. And I checked every gauge I had at every centimeter —not to mention listening, praying, and holding my breath. At seventy-five fathoms the hull began to make nervous noises—a perfect complement for the ones I was already making. I tried bleeding air from the ballast tanks into the cabin to raise the internal pressure. Tank air made the cabin smell like a rotting dungfish, but the noises stopped. I couldn't do that often, though, or I wouldn't have pressure left to blow the ballast tanks and surface—not to mention risking nitrogen narcosis if I boosted the pressure too high. That extra pressure also meant people on the t-ship weren't the only ones going to have a problem with decompression. I shoved the thought to the back of my mind; I'd take care of decompressing when—and if—the time arrived.

Centimeter by millimeter, *Fu* crept down. When we finally thumped onto the bottom, I was so strung out I damn near had a personally embarrassing accident. The depth gauge read eighty-two fathoms—and Fu was still in one piece.

Alongside the t-ship, I suddenly realized just what I was up against. Size and distance under water are deceptive; the damn thing was a lot bigger than I had thought. My original plan of using the waldo to dig a hole went out the port. I didn't have the reach. But I did have the high pressure hose.

The grapnel plates on liners and such, the plates we attach to for maneuvering them, are recessed. That makes them ideal places for all sorts of sea life to congregate, which in turn make it difficult to lock a clamp into. We use the hose to blast the little darlings out of our way. The same technique might work on mud, and ten meters of hose plus the pressure might just clear a passage for the cable.

I called the t-ship. "P.J., I'm going to use a high pressure jet of water to try and get a cable under you. If anything starts to look or sound sour, yell."

"*That,* you can bet on," came the nervous reply.

I took a firm grip on my own nerves and lined up the hose. *Spikefish* was standing off above and to starboard of the t-ship to act as my eyes. When that hose started, there was going to be sediment blowing every which way, and I was going to be blind. *Spikefish*, on the other hand, could use their directional prop to clear a field of view.

I also noticed they were standing off far enough to keep clear of flying debris if either of us imploded. Either of us?

If one went the other would. We were too close together to survive.

I said six quick mantras and started the hose. Muck billowed and my displays went a uniform grey. I boosted the hose pressure to max and started feeding it under the t-ship—very slowly.

"Judas priest!" P.J.'s voice came over my speakers. "You could have warned me about the noise. It sounds like the end of the world. The passengers about went out of their minds."

My hand paused over the cutoff. I hadn't thought about the racket all that crud being blown against the-ship's hull would make. "Is it only noise? No vibration? No stress groans from the hull?"

The reply was more than a little testy. "How the hell would I hear any stress groans over this racket? But, no. There's no vibration that I can feel."

"OK. Watch your gauges for pressure loss. This may take a while. I don't want to put any undue stress on the bottom of your hull."

"Good God, Chang. That's the last place to worry about putting stress. There's enough armor plate under there to take a nuclear explosion."

"Armor plate?"

"Sure. How the hell do you think we make those skips? On half-centimeter magnalloy?"

I was disgusted with myself. I should have realized the bottom of a t-ship would be armored. I cursed and started feeding the hose as fast as it would go.

Ten minutes later Spikefish announced, "Breakthrough! You've got a plume of muck a foot thick blasting out on our side."

I shut off the pump and retracted the hose. I used waldos and slipped a bubble-line under the edge of the t-ship. When it was in place, I turned the hose back on and blew it through the passage I'd made. I'd use that light line to pull the Spikefish's cable back under the t-ship.

"Bubble in sight," *Spikefish* told me.

I shut everything down again and lifted the *Fu* clear, trailing the line behind me. When I was in position, I told Igor, "Gimme the stern cable."

I hooked the cable to the free end of the line then moved back to my original position and reeled in the bubble-line and cable. So far so good.

"P.J., I'm about to run the hole for the bow cable, put in your ear plugs."

"Thanks for the warning, I've got my helmet on and everyone else is already suited up. If this thing starts to go, I'm going to blow the hatches to keep it from collapsing and hope the suits will protect us long enough to reach the surface."

Space suits as diving gear? Damned if I knew whether it would work or not. I didn't know if the suits had compensating pressure regulators. Hell, I didn't even know if they carried enough air for the surface. "Keep everybody together and wait for the deep-rescue rig. If you try surfacing, you'll kill everyone from decompression sickness." That was, of course, assuming the suits didn't simply come apart at the seams.

"Judas! I'd forgotten all about the bends. I'll start getting the crew to organize everyone now."

Let's hope you won't need to try it, I thought.

The bore for the bow line went as smoothly as the one under the stern had. I picked up the ends of both cables and

began backing off, towing the cables and pulling enough length to loop them back to the *Spikefish*.

I should have known that things were going too damn easy. I found the wrench in the works when I reached the side of *Spikefish* and tried to hook up the cables.

The *Spikefish* had surfaced because they were securing those cables with a bolt and shackle to eye pads recessed in their hull. A subtug's waldos are versatile tools, but not versatile enough to screw a shackle in position. Not with only two waldos. I tried—several times—but one thing or the other kept pulling out of alignment. Oh, sooner or later I'd have managed, but the way it was going, and from the looks of the bubble trail, I figured that by the time I got the job done, the t-ship would be in no shape to worry about. We had to find another way.

"Can you hook the cables to your external hangers, then hook up as if you were going to push us?" Igor asked. "Let *Spikefish* lift the both of you?"

"Not unless you can stand that beast on its tail when you lift," I told him. "My working braces are designed to push or pull, not lift. They don't have that much strength in the vertical plane. They'd shear as soon as the weight of the t-ship hit them."

I could almost hear the gears grinding in Igor's head—or maybe it was his captain's. "Can we disconnect, hook the cables to *Fu Manchu*, and let you lift the t-ship?"

I'd already thought about that. "Sorry. I don't have the power on ballast to do a level lift, and I've only got two swivel hooks. The others are fixed up or down."

"What about your docking bollards?"

Now *that* I *hadn't* thought of. Those bollards were fore and aft on the *Fu*'s top deck and sometimes we'd use them to tow. They were strong enough, but the damn waldos couldn't reach them to hook up the cables.

"Maybe, Igor. But how the hell do we get the cables attached to them?"

Spikefish's captain came back on the horn. "Same way *we* attach them—manually. Pull the cables and surface, we'll get them rigged. Then you can repull them under the t-ship and hook to your swivels with the waldos. When you're attached, point your nose up and pull. If you can move a monster like *Spikefish*, you can sure's hell lift that t-ship."

It almost worked they way he suggested—almost. There was only one little problem. Pointing my nose up wouldn't work. I had to see what was happening to the t-ship as I moved her, and in a nose up attitude the t-ship was behind and below, and my monitor cameras were blind at that angle. Nor could I see her from my bubble, it's topside and in the nose. I can see almost every direction but down and back. There *was* one solution. We hooked to the forward bollards and I set up to back *Fu* toward the surface while moving toward the reef and holding the t-ship about a meter off the bottom. If something slipped, I could always set her down.

Simple solution? Fat chance. Think about it. *Fu* is a subtug. It's designed to swim straight and level with minor changes in attitude while diving or sur-

facing. The command chair does not swivel. I was hanging at a seventy-five degree down angle—the shallowest I could manage and still see and apply sufficient lifting power. What was keeping me in position was my storm webbing which was making every effort to cut me into little cubes. Not to mention all the odd-ball stresses I was going to be putting on *Fu*'s already overstressed hull. Simple? You try it.

"P.J., I'm going to start lifting now. When I have you clear of the bottom, I'll start moving laterally toward the reef. I'll bring you up to your pressure depth as fast as I dare then you can take the internal pressure down about five PSI and we'll wait for a while."

The squeaky voice came back, "We're ready. And thanks for saving our tails, Chang."

That pilot had a lot more confidence than I did. But then, *I* knew all the things that could still go wrong. Very gradually I applied power, watching that telltale stream of bubbles for any change that might indicate an incipient implosion.

Nothing happened. The bottom muck was holding the t-ship like a suction cup. Shit! I was going to have to try rocking it free. But which end first? Well . . . it hit nose down, maybe if I pulled up and back . . .

"P.J., I'm going to have to try backing you out of the hole you dug when you bottomed. Get ready to blow your hatches if anything cracks."

"Roger, Chang."

I tried, I failed. The sucker wasn't moving.

Ohhh-kay . . . If it was a sub stuck like that, what would I do? Very carefully, making sure I didn't drop the cables off the bollards, I swung around and dropped nose to nose with the t-ship. I could see the pilot's suited and helmeted figure through the con port. It jumped slightly as the *Fu* settled in front of t-ship.

"P.J., you're stuck good and proper. I'm going to have to try pushing you backwards."

"Uh. Won't you push us off the cables?"

I hoped not, but it was a chance. If the t-ship released suddenly it could slide right off at least the bow cable. I was going to have to do some fancy throttle work to prevent that. "Nah," I told the pilot. "I'm going to take it real easy." I hoped I didn't sound as nervous as I really was.

"You're the boss."

I started easing on the power. For a few seconds nothing happened except that *Fu* began making uncomfortable noises. The *Fu* definitely did not like the stress I was putting on it at this depth. I kept inching up the power, watching the bubble trail and watching the sea floor against the edge of the t-ship. Then I saw a little puff of muck. That was what I'd been looking for; the t-ship had moved. As fast as I could, I backed off and moved back into my upside down position. I gave *Fu* power and prayed. For a second I thought it was another no go, then, like a plane taking off, the t-ship lifted clear of the sea-floor on a cloud of mud. I kept applying power and watching the depth gauge. As soon as I had clearance, I started moving up-slope.

"We're moving!" P.J.'s voice squeaked in my head set. "We're mov-

ing and still in one piece. You guys are great."

I eyed the bubble trail and felt a little more optimistic—it hadn't changed. Now I could give vent to my pessimism. "Don't get too confident," I snapped back. "We've got a long way to go. Watch your pressure and listen for any loud popping or cracking noises that might indicate you're starting to break up."

"I can't hear diddly through this helmet," P.J. snapped back. "But all my stress gauges are steady. I've also set the hatches on automatic blow-out. If one of those strain gauges goes into overload, the hatches will blow. That'll happen a lot faster and long before I notice anything wrong. Is that overconfident?"

Damn! I wish I'd known about those gauges earlier. It might have been a way to tell me what I was doing to the t-ship with my jockeying around. Why the hell hadn't I asked what monitoring gear the t-ship possessed? A slight case of chagrin made me a little abrupt. "No. Just smart. You could have told me you had the damn things, though."

"Sorry, Chang," P.J. apologized. "I didn't think they'd help."

"They would have and still can. Keep an eye on them and yell if they start acting funny. I can set you down and we can figure out what to do to correct the problem."

"Will do, Chang."

It's wonderful when people have faith in you—even if it may be misplaced. I kept watching, listening and rising. I breathed a little easier when I crossed back into safe territory for Fu and could start decompressing myself. I fed the time and pressure data to the computer and let it worry about the scheduling. As long as the red light was on, I wasn't going to open a hatch. Still, it took a seeming eternity to bring that t-ship up to the forty fathom line where *they* could start decompressing. Actually, it was less than a half an hour.

"You can relax a little, P.J.," I told the pilot. The external and internal pressures are in balance now. Even the bubble trail from your hull crack is tapering off."

"Relax, hell. That means the engineering section is full of water. I've got the hatch shored every way I can think of, but I wouldn't give a prayer in hades for it holding against more than two atmospheres pressure, so don't take us up higher than one atmosphere above what I dare set the internal pressure for. By the way, what pressure am I supposed to be setting? Decompression procedures are a bit out of my line."

No lie, I thought. I took the t-ship's pressure data and fed it to my computer, then passed the answer back.

"How long is this going to take, Chang—the decompression process, I mean?"

"Well, you've been at eight atmospheres for five hours. We can bring you up fairly fast since you've been on helium/oxygen—faster than if you'd had a high nitrogen content—but you're still going to have to stay under gradually decreasing pressure for close to a day, maybe longer."

"Uh . . . Chang, I have a small problem. My $CO/CO^2$ levels are starting to climb. We're running out of air."

"What about your air scrubbers? They should be good for several days."

"They're in the engineering section."

Uh-oh. "What about the suits?"

"Three hours, max."

"You have a problem," I agreed. "Let me think on it."

"Think fast, Chang. The hull may hold but the passengers won't."

I wish I could say that I devised some brilliant scheme for transferring air from the *Spikefish* to the t-ship and saved everybody, but life don't work that way. While I had been futzing around working the t-ship surfaceward, other people had been busy, too. What saved the day was the arrival of the Navy.

A deep-rescue ship is a joy to watch operate. Particularly the monster that arrived on scene an hour before we expected them. They cleared a level area on the bottom where I could sit the t-ship down, then used scuttle-bugs with waldos to do things I'd have trouble accomplishing bare-handed. They had *Fu* and the t-ship clear of the cables in minutes.

When *Fu* was clear, they squatted over that t-ship like amother hen on an egg. They sucked it up against their rescue port and that was that. The working spaces adjoining that port were pressurized to match the internal pressure of the t-ship and included living quarters, and a surgery.

Me, they didn't worry about. I could decompress myself as I toddled along toward my destination. By the time I reached port, I'd be back to one atmosphere. The fact that I'd also be eating canned grunt and chewing at the bulkheads from the cramped quarters—not to mention nursing the mass of bruises the storm webbing had left all over my poor body—wasn't their problem.

Of course when I finally did reach port, I had a real hero's welcome waiting. Sure I did.

"Nice job on that bit of excitement with the t-ship, Chang," the boss said. "The upper office is going to insert a commendation into your personnel record."

End of company gratitude.

Then there was the four line thank you letter from the space line that owned the t-ship, which carefully failed to mention thank you for what. Enclosed in the same envelope was a considerably longer and very emphatic letter from their attorneys informing me that since the Navy had delivered the ship—not transit-ship, just ship—to a repair facility, any claims for salvage would be met with legal action, including counter charges of fraud and attempted piracy. Also, they informed me, t-ship emergency systems cannot fail, and any attempt to claim they could or had would be highly prejudicial to the company. Any discussion of the hypothetical event would be vigorously denied and a slander suit immediately initiated.

Such were the official rewards for playing hero. Next time, I decided, they can go stuff a squid.

You tend to develop a pragmatic attitude in my line of work. If you didn't, you'd worry yourself into a room with padded walls and bars. I prefer my walls painted and my bars with drinks on them. I pushed the whole episode out of my mind and got on with daily task of staying alive and in one piece.

About two months later, I was sitting in a bar in Port Hovety, getting mildly

sloshed, when this outrageous blond slides up to my table and parks. "You promised we'd get smashed together, Chang," she says in this husky contralto. "Looks like you decided not to wait."

Blondes that look like a sex-maniac's dream do not generally choose to sit with half-lit subtug-jockeys, not unless they're on the hook—and *this* girl was *no* bar-flower. My brain went into neutral while my eyeballs tried to screw themselves in backwards. "Uh . . . do I know you? I think I'd like to if I don't."

The blond grinned at me and laughed in a voice that made me wonder if angels could sound anywhere near that good. "Not too original, Chang. But interesting." She grinned at me like a Cheshire Cat. "And yes, you know me, all right."

I did know the voice, damnit. But I couldn't connect the voice with the face or a meeting. I couldn't forget a face like that, let alone the figure. Could I? I was plain stupid confused.

She finally had mercy on my oscillating brain. "You pulled my tail off the bottom of the Wellington Sea about a month ago. I think I owe you at least a round for that."

Then the voice clicked. "You . . . you're P.J. Palmer?"

"In person and at your service."

"Well, I'll be stuffed for a bagfish."

"Not while we're still sober, please."

"No lie." I raised my arm and waved at the barkeep.

"I heard what they did to you," P.J. told me a while later. "I think it stinks. At least they *bought* off the passengers—and me."

"Bought you off?"

She nodded and gave her half empty glass a dirty look. "Three years salary, and 'Thank you, we're sure you'll have no trouble finding employment in another system. In fact, we have this lovely job opening up in the Friga Combine.' "

No. This could not be happening to poor me. The woman of my dreams was leaving before I even got to know her. "You're leaving?" I almost sobbed.

She gave me a grimace. "Probably. But not for *their* stinking job. There's not a planet in that system with a surface temperature above two-fifty absolute. I quit."

*Aaah. Ah!* "P.J., have you ever gone for a moonlight cruise on a subtug?"

"No, but if the subtug is the *Fu Manchu,* I think I might like to."

She did, I did, we did. By the end of the evening I told her what my initials stood for. In return she revealed that P.J. stood for Prudent Justice. My God, what some parents will knowingly do to an innocent baby. I manfully suppressed the urge to laugh. Besides, P.J. is a big girl. She'd probably have flattened me. We agreed that Sweetheart and Darling were much more euphonious and decided to keep our name calling to such innocuous terms.

"Darling," P.J. breathed in my ear, making my toes curl, "why *Fu Manchu?*"

"Huh?"

"Why did you name your subtug *Fu Manchu?* I thought subs were named after fish or women."

"Oh." I gave a small shrug, which made P.J. wriggle, which almost ended

that part of the conversation then and there.

A short while later she asked again, "Okay, now tell me why *Fu Manchu*. And no more shrugs."

"Spoilsport."

"Uh-huh. Tell me."

"Well, it's kinda dumb, really."

"So what. I really want to know."

"If you insist."

"I do."

"It's because, in the stories, *Fu Manchu* was a Chinese who loved pushing people around, and that's what subtugs do. Like I said, kinda dumb."

"I think it's cute," P.J. said.

"Dumb or cute, someday all this will be ours."

"Ours?" P.J. levered herself up on her elbows. "Was that a proposal?"

"Uh . . . I think so."

P.J. poked me in the ribs. "You'd better *know* so, because I'm accepting it."

The informalities that followed are nobody's business but our own, but some time later, my darling informed me, "Sweetheart, *Fu* may be all ours sooner than you think."

I was back to saying "Huh?" again.

"I know this shyster," P.J. explained, "and he's in real tight with the Navy. . . ."

She did indeed know a shyster. The salvage fee I finally collected, plus the trade-in value of the old *Fu*, almost put the new, larger and much better equipped *Fu Manchu II* in the clear. The first three jobs actually did clear her. *Fu II* is no harbor daisy either. She's a long haul, deep-water subtug, capable of towing a cargo drone clear around Tenifre.

P.J. proved to be as hot handling a subtug as she was piloting a t-ship. Not that she has the time to do much in that line right now. She's busy proving that the *Fu II* is more than roomy enough to raise a family on.

Actually, I prefer it it that way. When a job is offered, my darling wife looks at the money. I'm a lot more cautious; I avoid jobs where odd things might happen. No matter what the light-of-my-life thinks, I *still* ain't no hero. ■

---

●The sun is so large that, if it were hollow, it could contain more than one million worlds the size of our earth. There are stars in space so large that they could easily hold 500 million suns the size of ours. There are about 100 billion stars in the average galaxy—and at least 100 million galaxies in known space. Who says it's a small world?

Morris Mandell

# The Alternate View

# CITIES

## G. Harry Stine

As pointed out several times in earlier columns, we always tend to see and understand things within the context of our own experiences. Although some people are born with minds that possess abundant quantities of imagination —whatever that may be, and just because we can name it doesn't mean that we understand it—most people require years of education, training, and experience before they can develop the sort of perspective that allows them to exercise imagination and see beyond the familiar.

Take cities, for example.

Cities are the foundation of civilization. Indeed, Dr. Carleton S. Coon defined civilization as "the art of living in cities."

Historian Will Durant pointed out that civilization is different from culture.

Culture suggests agriculture.

Civilization suggests cities.

You can't have civilization without culture.

Cities depend upon agriculture. If you can't get enough to eat, it doesn't make any difference whether or not you've got a good ballet company. . . .

(This is one factor, by the way, that bothers the hell out of me when I watch certain science fiction or futuristic TV shows or read some science fiction. Here's the city, all by itself, surrounded by wasteland, apparently wasted during a thermonuclear holocaust, which is populated by mutants or savages apparently reduced to that state by said holocaust. I'll grant the existence of advanced agricultural technology that allows the city population to be fed by intensive urban farming or even by means of synthetic food—but this is never mentioned or alluded to. Why do these authors and screenwriters blow their credibility when a mere one-liner would fix it? In reality as far back as we have historical records, cities exist as part of a complex system. They cannot exist alone for their own sakes or for the sole sake of "culture." Real or synthetic milkmaids must still milk the real or synthetic cows. Real milkmaids are more fun, of course. And they usually think so, too.)

Having now either titillated or enraged you, I hope, let's proceed to discuss the city.

Villages grew from family compounds where related members of the same species grouped themselves together for the purposes of defense against predators of their own species or others, pooling of what little each individual might have in a world where there wasn't quite enough to go around, and for companionship. Family groupings are common among both birds and the anthropoids. The social structure is usually simple: The Old Man rules the group until he dies, is killed defending the family, or is defeated in hand-to-hand combat by a younger family upstart (which kills him) or drives him off (which also kills him). Among humans, the family group type of social structure is common from the hunter-gatherers

and up. It takes very little energy to maintain such a group.

A village is a grouping of more than one family. Among the birds and great apes, the social organization isn't much different from that of the family grouping except that birds apparently have far less social structure than the apes. Among humans, the village became a higher form of culture because of agriculture. It simply made more sense and required less energy if more people pooled their efforts and shared or traded among themselves for the agricultural products they harvested. And in the agricultural village a division of labor could begin; some villagers worked constantly making or repairing tools, warehousing the agricultural products, keeping score of who produced and consumed what and how much of it, and a leader who settled disputes. The village gave rise to the tribe and a higher order of social organization.

Most villages in the Cradle of Civilization—lower Mesopotamia along the Tigris and Euphrates rivers—up to about 4000 B.C. never had more than about a hundred inhabitants or covered more than a few acres.

Cities didn't automatically spring from villages. About 5000 B.C., the first "prototype city" existed at Jarmo in east central Mesopotamia, a stable community of stone-using people eating semicultivated wheat but without pottery or metallurgy. Another social-architectural prototype existed at Jericho in Palestine at about the same time.

The earliest human city that we can identify at the present time was Ur, founded some time before 3500 B.C. by a dark-haired group of people who called themselves Sumerians and who came apparently by sea from somewhere to the east of the headwaters of the Persian Gulf, perhaps from as far away as the valley of the Indus River which may have given birth to an even earlier high civilization; we don't know about any early Indus civilization because the archaeologists haven't dug that deeply in Pakistan yet. Ur was distinguished from villages and proto-cities by (1) literacy, (2) technological progress, (3) social controls, (4) political organization, and (5) emotional focus in the form of religious-legal codes symbolized by temples and walls.

The first human cities thus had things villages did not. The grouping of larger numbers of humans further diversified the labor force. Cities grew where intensive agriculture was possible because the sun shone, water was available, and two or three crops could be harvested each year. A growing abundance of food permitted people to create more than pots and mills and other tools needed to grow and prepare food. Some people in some cities made better pots than others, and these must have been eagerly sought after. But in Sumeria, trade wasn't anything as intensive as we know it today. There wasn't much to trade, and *there weren't that many people*.

Early cities probably had populations of less than 10,000 people. This number must be inferred because the actual census records don't exist. Today, a habitation boasting a population of 10,000 people might be called a "town," but it certainly isn't considered to be a "city." Furthermore, these early cities weren't very extensive. Early Iron Age cities such as Gordium, capital of the

Phrygian kingdom, had an area of 25 acres while Sardes, the Lydian capital, covered about 250 acres.

At the height of the power and extent of the Roman Empire, Rome covered only about 3,075 acres while Londinium (London) was only 330 acres and various provincial capitals ranged between 160 and 240 acres each.

*Cities of ancient times weren't very big by our standards.*

Nor was the process of urbanization linear. It depended on the development of technologies such as food supply, water supply, waste management, transportation, and communications.

I live in a part of the world surrounded by the ruins of many cities built by the Anasazi, the Sinagua, and the Hohokam Indians. Some exploration of these sites indicates they weren't all abandoned because of drought; some of them probably succumbed to a fatal build-up of toxic wastes caused by the lack of a good sewage system.

Cities didn't get very big for a very long time. We tend to think of Rome, Constantinople (Byzantium), Babylon, and other ancient cities as being like our present-day cities; they weren't.

As late as 1400 A.D., only 2.5% of Western Europeans (and there were only 73 million Europeans then) lived in towns, which are defined as having not less than 30,000 people. Northern Italy was the exception; the area had a vigorous urban life with about 10% of the population living in towns and cities.

Even by 1800 A.D., only 3% of the world population lived in urban concentrations (villages, towns, and cities) of more than 5,000 population. Only 45 world cities had populations of more than 100,000, and almost two-thirds of these were in Asia.

The first city with a population of a million was Tokyo, the largest 18th century city, with a population of 1,400,000, making it far bigger than Rome or Byzantium at their peaks.

London was the first European city to top a million population, and this occurred about the end of the 18th century.

The industrial conurbation followed, and Britain led the world in the midland cities of Manchester, Birmingham, and Leeds, followed closely by Germany in the Ruhr.

Most of our cities today developed from these industrial conurbations. But now we're seeing the emergence of a new type of city, one in which production has become secondary to residence and consumption. It's a strange new way of living that attracts people while at the same time mystifying them because a lot of the old, tried-and-true methods of living in and governing an industrial conurbation don't work.

I live in one of these: Phoenix, Arizona. It's a series of housing developments connected by shopping centers. Officially, Phoenix itself has a population of about 800,000, but the "Phoenix Metro Area" of more than a dozen officially organized cities and towns has a population of nearly 2,000,000. It's larger than Paris a century ago! An estimated 40,000 people *per month* are moving in. What are they doing? I've finally figured it out: They're building the houses, condos, apartments, office buildings, and light industrial buildings for the 40,000 people who'll move here next month. If this goes on (which it

won't), in five years we'll be taking in each other's laundry as the primary industry. This is only one of the problems. The current joke goes: "What's the difference between Phoenix and yogurt? Answer: Yogurt has a little culture." Phoenix has trouble keeping a symphony orchestra from going bankrupt, for example. But with VCRs and CDs, who wants to spend an evening in Symphony Hall when one can get nearly the same result in the comfort and privacy of one's own living room?

A new type of city is evolving. It may not be anything like the "city planners" and the architects would like to see—"arcologies" in which a million people live together in a mile-square pyramid, for example. That's right out of "The Machine Stops" by E. M. Forster. The city is evolving quite differently because we've solved the major technical problems of a city: energy and water supply, waste management, communications, and transportation. And it's giving people more freedom. As author Louis L'Amour observed in his excellent book, *Frontier*, "The automobile is modern man's answer to overpopulation."

Urban pollution? We've always had that. Less urban pollution exists today than a quarter of a century ago, and certainly less than a century ago. Because we recognize the problem, we're doing something about it, and today's cities won't disappear under a canopy of smog any more than they disappeared under a layer of horse manure.

Naturally, the people who live in the old cities either detest the new cities and wouldn't live in them on a bet (Great! Too many people in Phoenix already insofar as I'm concerned!) or insist on shoe-horning these new cities into the ways of the old, which won't work.

Cities: They don't make 'em like they used to! ■

---

**●It is unworthy of excellent men to lose hours like slaves in the labor of calculation which could be safely relegated to anyone if machines were used.**

**Baron Gottfried Wilhelm von Leibnitz (1646-1716)**

submitted by G. Harry Stine

Thomas A. Easton

State of the Art

# POETRY WITH RIVETS

A music critic once said Franck's D Minor Symphony couldn't be a symphony because it used an English horn. What will the literary critics say about this?

The chances are that you share a very common image of poetry: It is an abstruse art whose practice takes immense artistic talent and whose proper appreciation takes great perceptiveness.

You've been had. And it was no accident. A century or so ago, poetry was something any literate individual was supposed to be able to take a reasonable swat at, both as poet and as reader. But then the poets invented blank and free verse, readers scratched their collective heads and said "Huh?" and ever since, in self-defence, the poets and literature professors together have labored hard to sell poetry as something for the artistic elite alone. Anything accessible to the masses they sneer, is "light verse" to be dismissed out of hand.

Yes, I oversimplify. At about the same time as the birth of poetic elitism, paper and printing were becoming cheap. Mass magazines became possible for the first time, and prose became widely popular. The pulps—science fiction, mysteries, westerns—were the culmination of the trend. Poetry may have fallen from favor because, with its extreme compression of idea and story, it was better suited to an age that had to conserve ink and paper. The shift from poetic populism may have been a matter of making the best of a bad deal. But the change went too far when the poets and academics began sneering at the rest of the literary world as intellectual peons.

Science fiction writers and fans have felt the sneers most keenly. They are exponents not just of prose, but of a

new—or relatively new—kind of prose, and they are looked down on by the old-timers of both prose and poetry. SF, they are told, is not "literary." They suspect, with some justice, that what the sneerers mean is that SF is not old-fashioned.

Happily, the sneerers seem to be declining in numbers. SF has been around long enough to have earned a certain literary respectability, even among those who see respectability only in the dusty aroma of the antique shop. The gatekeepers of the literary club have actually welcomed SF into academic circles; there are courses, theses, and degrees, and SF criticism is as vigorous an industry as Shakespeare or Joyce criticism.

But there remains a dismaying number of holdouts. They control certain branches of the lecture circuit and state and federal subsidies for struggling artists, too often *not* including SF writers. They indoctrinate public school students with their ideas of "real" writing, too often *not* including SF. And though their slights mean nothing in the marketplace that allows commercial writers to raise their families and leaves the amateur status of "real" writers unblemished by anything so crass as mere money, those slights do hurt.

How can we convince the holdouts? Why not by taking something they all agree is literary and modernizing it? In fact, why not make poetry *more* modern than SF? In the process, let's hand it back to the people by showing, once again, how anyone can write a poem. To make things even better, let's say that the "new poetry" can be distinguished from traditional "modern poetry" only by knowing how it was written. That is, let's be sure that no one can sneer at a "new poem" because it looks different from the old.

As the word spreads, we can expect to see a vast outpouring of poetry. If everyone can write the stuff, everyone will. And the snobs will not be able to tell which poems were written by members of the poetic elite and which were written by Joe Blow from Kokomo.

The pattern of history must then hand the snobs a painful dilemma: Is SF, now an "old school," suddenly respectable in their eyes? Or is poetry, so hallowed for so long, as suddenly a disreputable upstart?[1]

Do you think producing this dilemma a tall order? Then I offer you the new poetic populism: POETRY FOR THE MASSES!

You, too, can be a poet. At the drop of a hat, you can turn out items like:

NEWTON AT SEA[2]
Fresh porpoises,
Leaping shocks,
Make me think that
Falling whales
Would flatten hawks.

Or should I say, "At the push of a button . . ."? You see, the secret is that hallmark of the modern age: the computer.

No, you can't program your PC to

1. Yes, my cheek does bulge slightly from the pressure of my tongue.

2. First published in the *SFWA Bulletin*, winter 1987.

write poetry. But you can write a simple program that takes words at random from word lists and plugs them into sentence frames (e.g., The ⟨noun⟩ ⟨adverb⟩ ⟨verb⟩ the ⟨adjective⟩ ⟨noun⟩). The result looks a lot like poetry, and the individual lines often contain vividly original images. And where the images are random nonsense, they nevertheless evoke clear, and even poetic, statements from your mind. Once you have corrected the computer's punctuation and grammar and imposed sense on its random nonsense, you have poetry.

You're not convinced? In the forty-three years of my life before I wrote my version of the program, I had written only two poems and published one. In the next two months, I "wrote" not only "Newton at Sea" but sixty more poems as well. And every one of them would have been impossible without the program to feed me randomly generated lines and images as raw material. My mind just doesn't work that way by itself.

You wonder whether the poems were any good? By the time I sent this article off to *Analog*, I had placed nine of my first 22 computer-generated poems with various publications, including *Star*Line*, the official newsletter of the Science Fiction Poetry Association. The others went to publications such as the weekly newspaper for my town and the fanzine *Lan's Lantern*.

Later, poems were accepted by still more magazines, including *American Atheist*, the *SWFA Bulletin*, and *Wide Open*. By the time I was reading the proofs for this article, I had found homes for 20 of my—and my computer's—efforts.

I find it intriguing that most of the magazines that have taken the poems are not literary poetry journals. This says to me that the poems seem to appeal most to ordinary people. And I *did* say that I was talking about poetry for the masses.

You're still not convinced? Then let's see how it works. I gave the program a vocabulary laced with medical words and turned it on, and this is what it gave me (the ⟩⟩⟩⟩ tags are markers explained below):

⟩⟩⟩⟩ An galactic doctor save helpfully in waters.
The spontaneous fantasy practically help a mangled dream.
The moon enable, subtle, from an tree.
A pink thunderhead eat drunkenly in childs.
An youthful tail logically waver the soaked doctor.
A nurse spread our comic bedpan.

Soak the brain the back young!
The library ward off its chipped door.

Tempt the disease the bedpan slow!
An subtle leg infrequently choose the chipped heat.
An expensive water privately fall a sick downpour.
Who secretly brighten the door?
⟩⟩⟩⟩ An motel enable, bright, by a needle.
A systemic tent save peculiarly in injections.
A profound needle choose abrasively in friends.

A shiny medicine help sweetly in beds.
They comprehensively coddle the injection.
⟩⟩⟩⟩ The sentient salvation politely bring a electric tension.
An political pine uniquely describe a efficient spine.

⟩⟩⟩⟩ Land the health the work expensive!
An generous love stupidly choose the slow health.
An wise woodchuck notoriously argue an foolish clinic.
Who elegantly explode the ambulance?
A tent fall whose soft friend?
A spontaneous dream rightly babble an nude relief.

Defy the fantasy the brain chipped!
The boat infuriate, diseased, in the lover.
A touring disease fitfully break a automatic table.

⟩⟩⟩⟩ Coddle the dream the ocean red!
An speedy friend deceptively disable a generous medic.
A award collide our cold back.
I hatefully decline a muscle.

She assiduously listen the mist.
A medicine hold its healthy quarantine.
⟩⟩⟩⟩ They smoothly seduce a ocean.
A religious ocean blast tastefully in boats.

A slow plague competently break the aged picnic.
Eat a deer a library nude!
A broken mist heal unsuccessfully in maps.

A map show, comic, over a agony.
⟩⟩⟩⟩ Argue the lover the life efficient!
A equal leader briefly disable a roaring machine.
⟩⟩⟩⟩ Cause an needle an plague reluctant!
I politely torment a woodchuck.
An distant award astonishingly mistreat the loud tourist.
⟩⟩⟩⟩ Sing a work a death reluctant!
Nourish an hay an fantasy spirited!
Who amusingly journey an crime?
⟩⟩⟩⟩ A military emergency artistically disable the religious operating room.
An navy show, drunken, in the park.
The brain speak, galactic, beside a emergency.
Decline the tube the dirt green!
An systematic bed urgently brighten a old swallow.
The fresh door learn ignorantly in downpours.

A ambulance deliver its bloody friend.
Save a liver a ambulance red!
⟩⟩⟩⟩ A grudging lobster disable studiously in fantasys.
Jump the park the beach foolish!
An sick leaf shine anxiously in navys.

Coddle the tube the spine ill!
⟩⟩⟩⟩ An arm spread, reluctant, nigh a muscle.
It subtly blast an leg.
The boat burn, elegant, over a life.
The cold crime deceptively show an comic work.

Study the agony the tree pointed!
An wind infect my astounding map.
A aching hay relatively drip an serious dream.
An highway bring his systemic window.
A lobster describe your diseased library.
She ideally land the tumor.
Repair a tumor a sweat gregarious!
A window land its generous needle.
⟩⟩⟩⟩ A expensive floor record thoughtfully in surgeons.

There's a *lot* of garbage there! But that very first line resonates for a science fiction book reviewer who has recently reviewed one of James White's Sector General novels. Given that thought, other lines begin to click into place, and I begin to drop those ⟩⟩⟩⟩ tags to mark lines I might use to write a poem. I work on the grammar. I free-associate a bit. I add and subtract and monkey around. And finally, I have:

CRITICISM

In James White's age of Sector General
Medics dream of oceans red with lobsters
Ill with a nasty plague
That they can cure
While all the sentient worlds huzzah!

White's mind is clean of ills venereal.
Nor do BEMs bare muscled arms to needles
Filled with strange forms of death,
Drugs or virus,
Such as we know too well on Earth.
His aliens do not live in corners,
Do not contaminate all those they love,
Or poison medicine
With blood they give,
Intending life but spreading death.

He knows the work of health is expensive,
But he ignores this economic fact
For ideals of service
And tolerance
Among the stars at risk of war.

Should our author turn to Earthly hazards?
In think that all along he has, for though
He seems to advocate
The fight for health,
He really means to fight for peace.

The relationship between start and end is clear, even though I have imposed form and sense. What form? What sense? They emerge from what is within my mind, in response to what the computer provides. Given the same raw material, you would surely come up with a very different poem. But you would come up with one. All you need is the kind of open-mindedness that lets you look at the computer output and say not, "What utter nonsense!" but, "How can I *make* this make sense?"

The task can be very easy, as in the case of "Newton at Sea," whose five lines were selected almost as is from the computer's raw material. The task can also be more challenging, as in the case of "Criticism," in which the computer's contribution becomes almost in-

visible. In both cases, however, the computer is essential.[3] It is, in fact, so essential that when I sit down to write a poem using my computer program, I never know what the poem will be about. I have a vague idea of the general territory it will occupy—medicine, rural life, gardening, robots . . . —because of the vocabulary I give it, but that is all. The specifics emerge from—and in response to—the computer's random gabble. And if it sounds a lot like brainstorming, well, it is. It's "computer-aided" or "computer-guided" brainstorming.

Want to give it a try? Then take the same computer output I used, pick out lines that resonate for *you*, and shape them into a poem.

Better yet, write your own poetry program,[4] use it to write a dozen or so poems, and submit them to assorted newspapers and magazines. Maybe we really can redefine poetry as a modern, populist art form!

With rivets, yet. ■

3. Does the computer stay essential? Perhaps not. I find that the more I use the program, the further my poetry departs from the raw material it gives me. Eventually, I may start writing decent poetry without using the program at all. If so, I will have to start calling it not a computer poet, but training wheels for the poetic mind.

4. Mine is available on a shareware basis—meaning that you pay only if you like what it does for you—from Kingfisher Shareware, Box 805, RFD 2, Belfast, ME 04915. Send your request along with a 5.25 inch disk formatted for an IBM-PC compatible computer or a TRS-80 Model 4P (say which) and return postage.

## Murphy's Eleventh Law

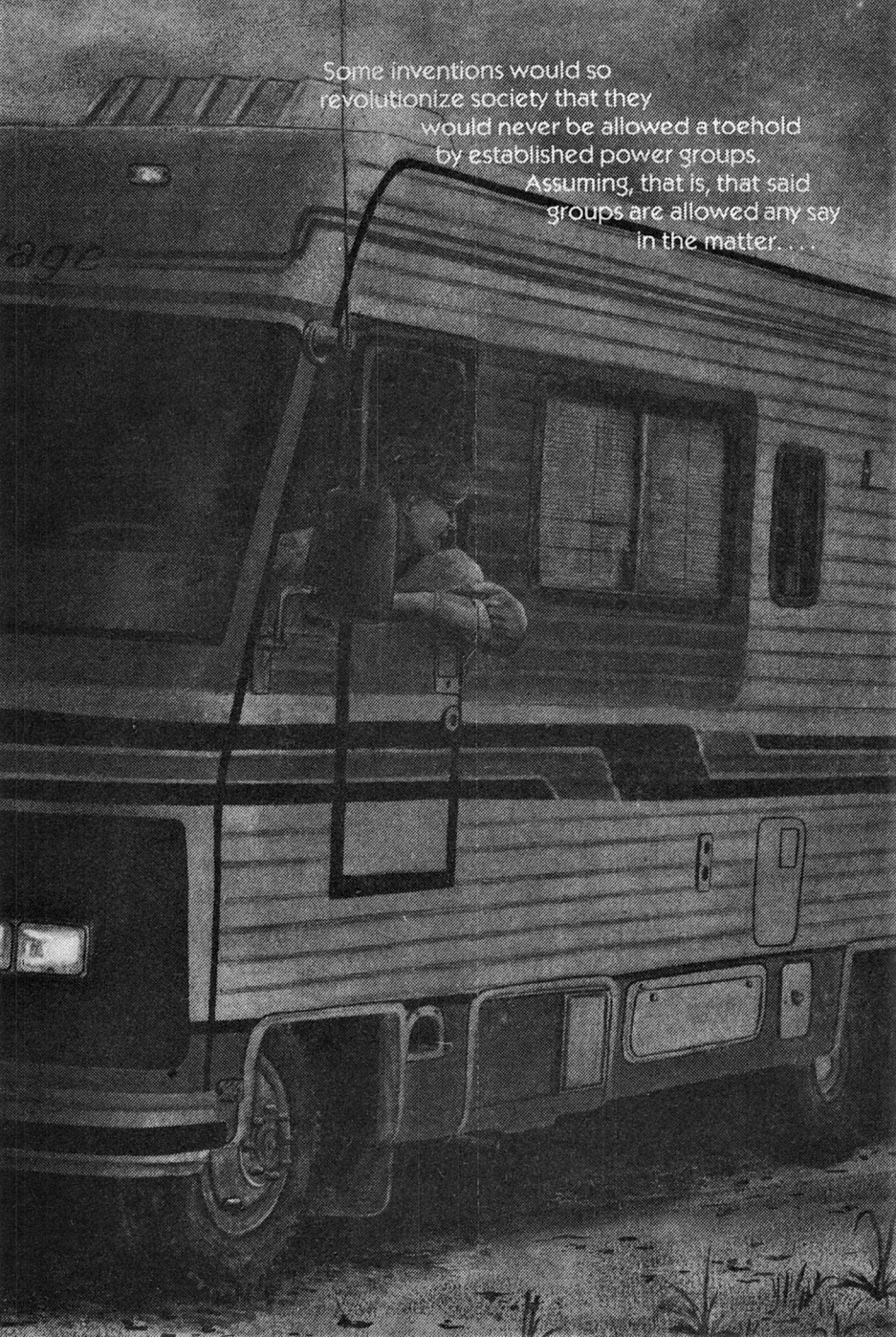
● It is impossible to make anything fool proof, because fools are so ingenious.

Jerry Buchmeyer

## G.B. Shaw's Principle

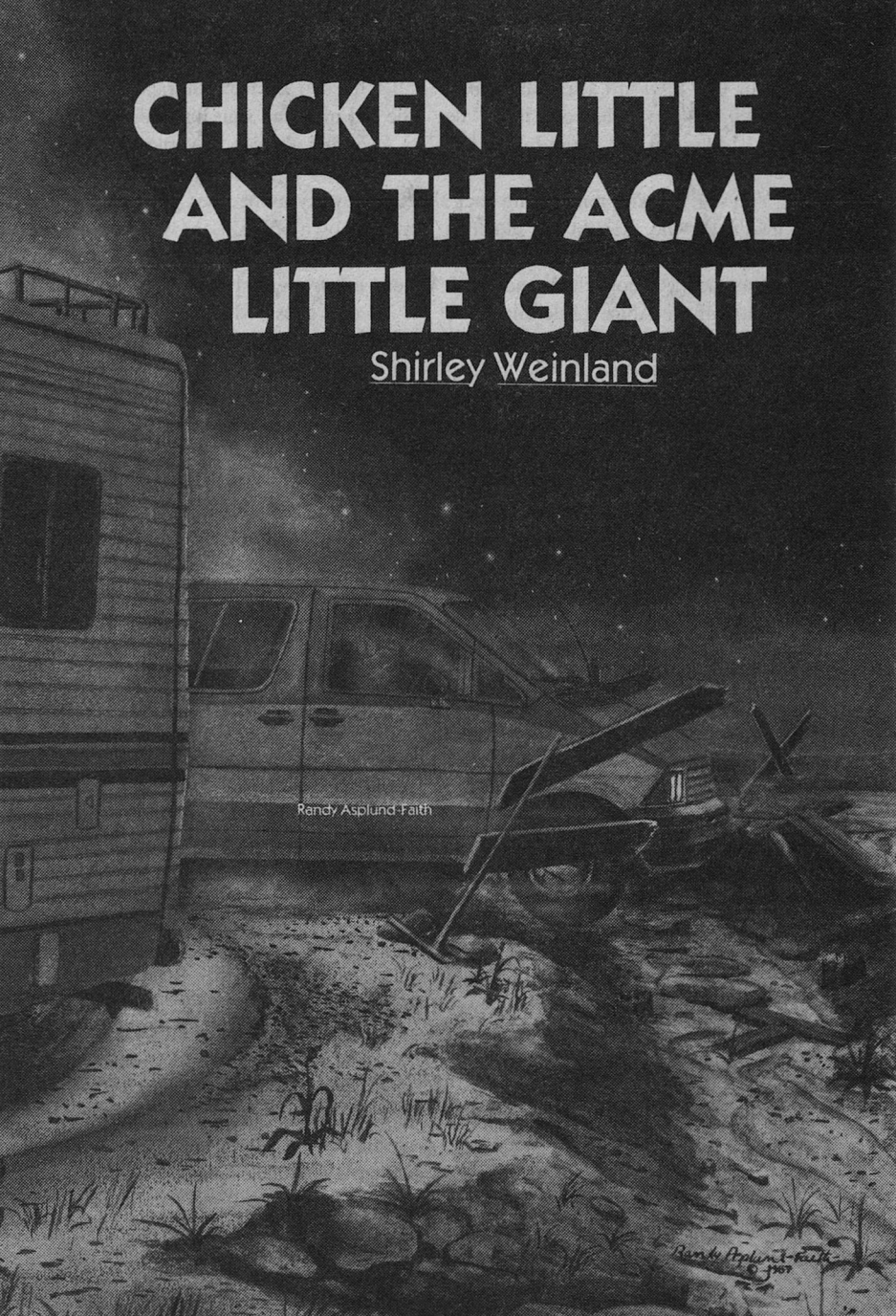
● Build a system that even a fool can use, and only a fool will want to use it.

Jerry Buchmeyer


Some inventions would so
revolutionize society that they
would never be allowed a toehold
by established power groups.
Assuming, that is, that said
groups are allowed any say
in the matter. . . .

# CHICKEN LITTLE AND THE ACME LITTLE GIANT

Shirley Weinland



He smiled as he came out of the elevator and saw me. It wasn't a friendly smile.

"Well, if it isn't Chicken Little," he said. "I thought we retired you last year, Janet."

"You did," I said, not smiling back.

Twomey, who thought the old man had forgotten, said "Ms. Johnson agreed to come back as a consultant and finish her study of the Acme Little Giant."

"I remember," the old man said. He didn't like being misunderstood. He had said what he did to see if I was still angry. I was.

He sat down on the edge of the nearest desk to look at me eye to eye. "Look at it from my side, Jan. My engineers told me a power source that small had to be a scam. The Acme Little Giant! How could I believe something with a name straight out of a Roadrunner cartoon?" His glance slid away from me to something awful in the distance.

"But if it isn't the Acme Little Giant that's cutting into electricity sales, what the hell is it? Sales of gas and electricity have always gone up as population grows—always! It can't have stopped happening just because we're coming to the end of the century!"

He'd forgotten about me. He picked up his messages and went into his office to start work; it was 9:58. At 10:01, he handed my signed consultant agreement out the door and asked what Twomey had promised me.

"A trip to Paris to report to corporate management," I said.

He frowned. "Paris in February is no incentive. We have to know, Twomey. Add a couple thousand in expense money up front and make it worth her while. Cut her a check, Twomey."

In his chilliest voice, Twomey said "I'll have to ask for authorization," but the old man had shut his door again.

"Cut her a check, Twomey," I said.

Twomey sighed, which was as close to disloyalty as he ever got, and went into his own office. Len, who had been waiting for him to disappear, stuck his head out from next door.

"I can guess what you're here for, Janet. There isn't anything to find so let's get Chicken Little back to find it and tell us our options."

"Oh, there's something to find," I told him.

"That's plain crap, Janet, dear. The only villain is thirty years of solar panels, windmills, cogeneration plants, and all that insulation and double glazing. And as for the rural areas using less diesel, well—farming's in a slump, isn't it?" He saw Twomey's door open and ducked back in like a turtle pulling back into its shell.

Twomey was so relieved our multinational parent wouldn't allow payment, his smile was sincere. "Sorry, Janet. No expense account, no expense check—no exceptions."

I didn't care as long as I was back at work. The ten months I'd spent driving my motor home around the country looking for the life-after-work I'd always been too busy for disappeared as if they'd never happened.

It wasn't until I was in my temporary office after lunch that I recalled what Len had said—rural diesel sales were also down. Now that Global Energy had swallowed up what used to be California's biggest oil company as well as its biggest electric utility, I could check that out, too.

I had the terminal practically smoking when a young man stuck his head in and said "Mr. Twomey told me to validate your parking chit."

I got it out and handed it across the desk. He passed the scanner head over it and said "Jeez, what are you driving that takes up that many parking spaces, an 18-wheeler?"

"Motor home," I told him. "Thanks."

When I finished, I had two maps of rural California for each of the last six years, starting in 1989, and one final set for last Friday. The set for electricity sales made it clear that once cities and towns with more than 2,500 people were excluded, the drop in demand was geometric. What had hidden it, until just recently, was that urban areas were buying power faster than ever. The map for last Friday was why they had called me back—the drop was spreading to larger towns.

Sales of diesel, gasoline, and synfuels had started dropping later, but the decline was almost twice as fast. Nobody paid much attention because demand for petrochemical feedstocks had gone up and you can't make both from the same barrel of oil.

The phone rang, and when I heard it echo, I realized I was the only one still there. Only one person would be calling me at 10:58 at night.

"Hi, Ingrid. How's the computer room doing?"

"Janet! I might have known it would be you. I'm shutting your terminal down now."

"Right. I have what I need."

All the terminals went down at 10:59 so that Paris could start asking the mainframe for data without interference. I hoped they'd see my maps—I was proud of them.

Still, corporate management was going to need more than a set of maps before they'd believe in a sphere the size of a soccer ball that would run a whole house for three years—or, apparently, a tractor. After all, nobody advertised the Acme Little Giant, you couldn't order it from any TV catalog, and you couldn't look up the patents or read the scientific papers about it because there weren't any.

The physicists and engineers I'd asked told me the Acme Little Giant was either (a) black magic, (b) a slow, fully controlled atomic reactor, or (c) one hell of a battery and, in any case, impossible. But I knew better and my maps said I was right.

The west has a number of hot, dusty places called Indian Wells, but the one where I went to high school had a secret weapons laboratory until the government closed it down in 1989 "for economy reasons." My father was dead by then, but my mother still lived there (she died two years ago) and I still visited.

I first heard about the Acme Little Giant power source at a barbecue my folks had in 1971, when the scientists and engineers, worried about being laid off ("riffed") were trying to dream up a sure-fire product they could make locally so they wouldn't have to move. Several years later, when it became clear the government wouldn't keep all of its isolated secret labs, the twelve-year-old son of my parents' neighbor tried to explain to me—by drawing Tinkertoy diagrams—how the Acme

Little Giant had this really great atomic lattice structure that really worked! So even if the lab did close, his family could stay on.

Then, sixteen months ago when I came out to sign the papers for the sale of my parents' house, I was eating lunch in the Indian Wells Cafe when the man in the booth behind me told his buddy: "They wanted to charge us eight thousand just to get the wires up to the house, so I got an Acme Little Giant for a thousand and it's lasted me a year already and has two more to go before I have to replace it."

"I thought you had solar."

"That's what you were supposed to think. If the big corporations heard about it, they'd get the government to make it illegal, or something."

"Yeah, or do like Detroit with that car battery that never wore out—buy up the patent and bury it."

That conversation started me comparing building permits with electricity hookups, and asking about power sources and what they could do. It was when I tried to talk to our people about the Acme Little Giant that the old man gave me the choice between retiring and being fired.

It was almost midnight. I drove as far as Paso Robles and slept until late morning. I wanted to let any morning rush pass before I tried the new truckway for the first time. I'd scared myself enough when I pulled in for gas. The radio turned itself on and startled me so I jerked the wheel and went right over the curb. I wondered if I'd ever get used to that new mandatory travel alert system—I didn't need to be distracted by the news that all northbound freeway lanes were closed this side of King City because a gasoline tanker had hit a hay truck.

Two inspectors checked me and my motor home at the truckway entrance. I passed a breath test for alcohol and a spit test for drugs while the other inspector checked tires, brakes, the level of gas in the tank, and even the oil and coolant.

"Your first time through?"

"Yes."

"You'll do fine. Just stay in the slow lane and keep a steady fifty-five. Now this case," he reached in the window, "has an oxygen mask and an hour's worth of oxygen. It's for the Trans-Sierra tunnel. If the warning sign comes on, use it—the fumes can build up in there. If you have to stop in the tunnel, turn your engine off immediately. You hand the case back at the exit station wherever you leave the truckway. Got it?"

"Got it, and thank you."

The truckdriver at the next inspection booth was loud and angry at being refused entrance. He was the first I'd seen them turn away. It was a company truck, not an independent, and I wondered what he'd tell his boss. I pulled into the "slow lane" and noticed that most of the trucks zipping past were independents, not company rigs. Coincidence? Corrupt inspectors? Maybe it had something to do with the fact that all their engines sounded alike.

The truckway from Paso Robles, California, to St. George, Utah, has no tight curves—almost no curves at all—and no grades steep enough to turn a fully loaded big rig into a guided missile. I

felt sorry for the refused driver who was going to have to battle it out with cars, drunks, and strips of retread tires on the freeways. (The ex-governor who put the truckway through spoke of freeways as "roadbeds for a slowly moving slum.") Of course, there is that tunnel.

Three lanes feed into two at the start of the Trans-Sierra tunnel, to leave one lane for emergency equipment. You're bumper to bumper at fifty-five miles an hour with an entire mountain range on top of you and the knowledge that California has earthquakes. And you stay that way for thirty-four miles.

But what spooked me most was the change in sound. The moment we were in the tunnel, the rig on my left was gliding along with no engine noise, only the sound of tires on pavement. When I rolled down my window to make sure, it was so quiet I heard Johnny Cash walk the line on their golden-oldies disk player.

I was the noisiest thing I heard. No wonder the "Dangerous Fumes Level" sign didn't light up. Out of the ten vehicles I could make out around me, there couldn't have been more than two others with internal combustion engines—diesel, gas, or synfuel. The ventilation shafts and air purifiers were more than enough to handle that small a load.

The rig beside me was an independent out of Earlimart, and that was one of the places where diesel sales were way down. But I hadn't seen anything but ordinary engines at the inspection station. I hadn't paid enough attention to what was going on around me to notice if any trucks were passed without an engine inspection. I was willing to bet that Mr. Earlimart was running on Acme Little Giants and his engine sounded like the others outside the tunnel because he'd rigged a sound system. And they turned the sound system off in the tunnel because of what tunnel walls do to sound—it was too much noise.

When we finally came out on the desert side of the Sierra, I took the first exit, handed in the case I hadn't needed, found a place to park, and watched the inspectors. Sure enough, not every engine got inspected, and the ones that passed without an inspection were independents—all of them. I was getting cold sitting there. A man came over to see if I was all right. I said I was.

"First time through?" he asked.

I nodded.

"Next time let your husband do it," he said, and went on back to the office.

At least getting angry stopped the shivering. I pulled out and headed for Highway 395, wondering. On my way back from the East Coast, I'd worried about how many houses had loose or broken solar panels or nonworking windmills. It seemed a shame that so many people couldn't afford to have such important investments fixed. I should have guessed most of them were fakes, like the truck engines that sounded alike.

I turned off 395 at the old shortcut and pulled into what used to be the parking lot for the Indian Wells Cafe and was now the entrance to the Indian Wells Cafe, Motel, Truck Stop, Airport, and RV Park—Angie's empire. Angie and I have been best friends since the first day of high school, although you wouldn't have thought so when I walked into the cafe.

"You didn't come out last spring,"

she said, glaring at me from behind the cash register.

"I'm glad to see you, too."

She sent me to a table, made change, sent a waitress over with a menu and a packet of family pictures, had a quiet, tense conversation with a busboy, and recleaned three of his tables. Even at our age, Angie is like a small, reverse whirlwind, scattering order and clean surfaces wherever she moves.

When we met in September 1949, the Indian Wells Cafe was a dusty little place with an outside refrigeration unit almost as big as the whole cafe (you could see the *Air Conditioned!* sign all the way from the highway) and Angie lived with her parents in a trailer out back. My family lived near the lab, in a tidy housing complex where my mother grew roses, desert or no desert, and tried to construct a satisfactory daughter out of unpromising material. Now Angie had a six-room apartment ("done" in French Provincial) above the new cafe, and I lived in a motor home like a hermit crab steering a too-big shell around. ("By yourself?" people asked, as if that had to be illegal.)

In the years since we met, Angie's had five husbands, four kids, and three step-kids while I refused even to approach marriage. On the other hand, I've been to Europe eight times and Australia once while Angie's longest trip was to Los Angeles. Still, we've always been close enough that I didn't have to be told who the people in the pictures were.

When the cashier came back from break, Angie started over, pausing only to clear one table, pour fresh coffee at two more, and show the busboy what she meant by "clean."

I asked her about the Acme Little Giant. She looked at me sharply, then relaxed.

"Of course, you're retired—you don't work for Northern California Power anymore. It'll take two to move that beached whale of yours, though. I'll set up the appointment with the garage for tomorrow night."

"Hold on, Angie—I am working for them. They called me back as a consultant, to find out about the Acme Little Giant."

"Then I'm not talking."

"Why not?"

But she was gone again, this time to snatch a dinner right off the tray, take it back to the kitchen, and bring a proper version out herself, leaving a cook to peer anxiously out through the pass-through. Angie's never let me near her husbands—she used to pretend it wouldn't be safe—but I recognized that anxious baffled look. It goes with a man's realization that Angie will stop dead some day, but she's never going to let up in this world.

When she came back, she said, "Look, Janny, if Northern California Power and the other big companies found out about the Acme Little Giant, they'd try to take them away from us—they'd find some way to get them declared illegal."

"Why? Aren't they safe?"

"They're perfectly safe—I asked Dr. Dan. If they weren't, I wouldn't have them on my land. That isn't what I mean—look at what the big companies did the last time the government tried to put some land up for sale, all those big TV ads about saving it for the future.

The government wound up releasing only about half what it had planned to. People had been counting on it."

I didn't know what government land had to do with the Acme Little Giant and I did know that part of Angie's dislike of corporations is phony—she's a corporation herself, for tax purposes—but I had heard two clues. Dr. Dan knew whether the Acme Little Giant was safe, and she said "have them on my land," plural.

Angie brought my dessert herself—she serves what is without doubt the best apricot pie in the eleven Western states—and I finally got her to sit down long enough so that we could talk seriously. I tried to explain that the Acme Little Giant wasn't going to stay a secret much longer.

"I don't see why not, as long as you don't go shooting your mouth off."

"For one thing, because I'm not the only person who can read numbers. For another thing, because when I came through the Trans-Sierra tunnel, drivers turned off their engine sound—maybe so they could hear the music on their tape players. And homeowners aren't keeping up their sham solar panels and fake windmills. Other people aren't stupid."

Angie started straightening the little packets of sweetener in their holder. "So," she said, "I'm supposed to risk everything I've worked for and help you impress your boss because sooner or later it's all going to come out anyway? That's tacky."

On my way back to my motor home, I pulled up the collar on my jacket and wished I'd gotten a longer one, with a hood. I brooded briefly about rural paranoia—the notion that rich city folks are out to keep you from getting what's rightfully yours—and about how TV encourages it. But there was more to it: a dollar that enters Angie's hands is unlikely to escape. That defensive tone meant that money was involved.

At the back fence, where I was parked to be away from the crowd, I looked back at Angie's empire to see if I could figure out how many Acme Little Giants she might have around the place. Figuring one house was equal to one Acme, and counting the landing lights for the airfield, I came up with at least twelve. She was right about the tacky part, though. I figured I wouldn't press her any more—anyway, she'd already given me the lead I needed.

The next morning, I went over for breakfast and found Angie all sweetness. She sat down and had a cup of coffee with me, to make up for last night.

"I talked to Carl over at the garage after you left last night. He's got axles and motors that'll fit and he'll do the conversion for you tonight."

"Angie, I'm not going to give up my work—"

"I know, I know—but you don't have to let on that you're using them yourself, do you? Just think about it—and once you see how much money you'll save—" she shrugged.

Dear Angie, always so hopeful.

"So, what have you planned for today?" she asked.

"I thought I'd drive over to the complex and have a look around."

"Relive a little of your lost youth? I'll see you at supper, then."

Angie values my youth more than I ever did; she even used to envy me for "having such a nice mom." But I wasn't going to revisit my memories, I was going to make use of them. The Doctors French had always disapproved of me—I didn't help my mother enough around the house, didn't write home often enough to keep her from worrying, and didn't even take calculus. But Dr. Dan French had assured Angie that the Acme Little Giant was safe, and I wanted to find out how he knew.

They'd been thirty-one when I was fifteen. Now they were in their seventies, but still in the same house, and still disapproving. Dr. Anna made tea while I explained to Dr. Dan that Angie was helping me get some Acme Little Giants for my motor home, but I was concerned about safety and I didn't know who else to ask.

"Angie does a great deal for the people around here," he said. He made it sound like a warning.

"Sugar?" Dr. Anna asked.

Ignoring his wife, he started telling me that the power source was perfectly safe, as long as people followed instructions. It could produce quite a lot of ionizing radiation if it were crushed at high temperatures, but it would take more than a high-speed, head-on collision to do that—the case was specially hardened steel. It could become unstable with time, but it would become useless years before it became dangerous. "In any case, we arrange to replace them every three years, which gives us a nine-year safety margin."

"They're much safer than gasoline," Dr. Anna said.

And that was all either of them would tell me.

I left—they were going out—thinking about what they had said. "Safer than gasoline" wasn't particularly reassuring. And when Dr. Dan said "quite a lot of ionizing radiation," I had no way of telling whether he meant fifty chest X-rays or a tenth of a Chernobyl. One thing was clear: he'd said "We arrange to replace," not "they arrange," and that was evidence.

I hadn't really looked at the valley for years—just driven back and forth across it on my way to see Angie or my folks. For the first time, I noticed that the "abandoned" lab had a fringe of cars around it, even on Sunday. And for an area whose main source of income should have been retirement checks, there were far too many young families picnicking among the cottonwoods at the park. Furthermore, the canyon so many rockhounds had dreamed of getting rich from, once they found the main rare-earth deposit, was fenced off and posted by the Epitome Mining Co.

I needed to think, so I followed a new road up a canyon northeast of the valley, climbing in a long slow arc until the road turned sharply through a cut and burst out into another valley. I knew where I was. To the left was Wild Horse Spring, with its cottonwoods and a small marsh with clumps of water willows and rough, sedgy grass. The once-empty valley was dotted with tents and half-built houses, and it looked as though every one of them had a garden started.

So this was the connection between federal land sales and the Acme Little Giant. How many more valleys had Acme Little Giants sucking up a million

year's worth of earth-stored water and turning emptiness into "a place of our own"? Then I saw a boy—thirteen, maybe, just beginning to leg out—standing motionless by a creosote bush, a rifle in one hand, a jackrabbit in the other. When he realized I was looking at him, he dropped the jackrabbit and raised the gun. I wondered—briefly—if his grandfather had said to him what mine had said to me: "Remember, never point a gun at anything you don't mean to kill."

I put my hands up. He might have started it as a game, but he could kill me and we both knew it. He gestured for me to go back. I sawed the motor home around slowly, and left. In the rear-view mirror, I saw my tracks—like an asterisk—and the boy still waiting, gun in one hand, rabbit in the other.

It should have occurred to me before. The Acme Little Giant made it possible for people to escape—not just to leave small apartments and past sins, but to move away from rules they didn't like. I drove back down the canyon seeing civilization unravel as people headed out to the empty places, beyond the reach of building inspectors, social workers, and 911.

The wind hit the motor home as I came out of the canyon; it was strong enough to be kicking up a small dust devil that skittered across the valley floor. At least the desert was still the desert—tumbleweeds bounding down the road and evidence of an impressive gullywasher not many weeks ago, long enough for the pools to have dried up, but not long enough to rust a half-buried can.

When I got back to Angie's, I pulled into the truck stop for gas. I was sitting there watching the money mount up when a truck driver came over to my window.

"Hey, lady."

"Yes?"

"Look, I don't want to worry you, but somebody's put a snitch on your housecar."

"I beg your pardon?"

"A snitch, a whatchamacallit, a transponder—you know, what trucking companies use to check up on drivers. My wife and I, we don't approve, you know? So we carry a detector, and every time we spot one, we tell the driver. I never heard of putting a snitch on one of these, though."

"Thank you for telling me," I said grimly. "Thank you very much."

Whose was it? Not Angie's, that wasn't her style. The Doctors French didn't trust me, but they weren't likely to keep a snitch in a kitchen drawer in case I stopped by someday. There hadn't been time at the inspection station, and at the truck stop in Paso Robles, I'd been outside, keeping an eye on the attendant.

That left Twomey and the young man who validated my parking chit and knew what and where I'd parked. I didn't know what a snitch looked like, but as soon as I got back to my space, I searched anyway. I found it in the left rear wheel well and set it to pickle in a pan of strong saltwater in my sink.

Oh, I'd been so full of myself, so proud that they'd recognized that I was right. And all the time, all they wanted was a Judas goat to lead them to the right place and right people, exactly as

I had just done. To them, I was still that pushy woman who never did belong on the top floor anyway. And they were waiting for me out there in the dark.

At supper, Angie asked me if I wanted a couple of aspirin. What I wanted was rescue.

"I'm okay, Angie—just not good company tonight."

"I know. It was seeing how they let your mom's roses die after all the work she put in. I didn't have the heart to tell you."

I hadn't even thought to drive around to our side of the block and see the house we used to live in. "I think I'll go back and watch TV or something," I said. "I'm not really hungry."

"Sure—we'll talk tomorrow. Oh, don't forget Carl."

As I was walking back, I saw a bit of light moving around my motor home, like the beam of a small flashlight. I hid in a camper shadow and watched. If they were putting another snitch on, it meant two things: the saltwater had shorted out the circuits the way it was supposed to, and they didn't have all the information they were after.

I waited until I saw two men in dark clothes hurrying away across the open ground near the streetlight, heading for the motel. I took my time—a second chance is even better than a rescue, and I wasn't about to blow this one. Sure enough, they'd put on another one, exactly like the first, except in a different wheel well. I left it where it was. If they wanted to follow, I knew where I was going to lead.

When we were fifteen, Angie started dating Mike and, to get even, I picked up an older man at the bowling alley. (Actually, Herbie was barely old enough to be in uniform.) He "borrowed" a jeep from the motor pool and drove us out in the desert for a picnic. I remembered the route—I'd seen it again this afternoon.

I "sneaked" my motor home out the entrance with the lights off and took the old road under the off ramp. I watched the rear view mirror until I could see a dark van shape, outlined by the lights from the truck stop and the off ramp. They were sure I was going to lead them someplace important, now that I was free of that first transponder.

After a couple of miles, I turned off on a dirt road that led past some old railroad buildings, boarded up since I was a kid. All they had to do now was follow my dust.

See, Security spotted that jeep before we ever got to the place where we were going to build our fire and have our picnic. Herbie didn't want to get caught, so he bounced us down this same dirt road, leaving plenty of dust behind and gradually slowing till they were almost up with us. Then he told me "hold tight," pulled a hard right, and stopped, just as I did.

And the van crashed through the barrier and sailed right into the dry wash the way the Security car had forty-five years before. Roads last in the desert; bridges keep washing out.

I watched until both men had crawled out of the van, then I called in the accident on my CB—anonymously—pulled off the second transponder and set it to pickle with the first, and made my way sedately back to the truck stop garage, to get converted before anybody did make it illegal.

Carl took me into his office where he had what looked like an ordinary Crediproof terminal. The men were already pulling my engine.

"You sign the pledge form on the pad there," he said. "Use the special pen just like you're signing for overseas air tickets or a new engine, then key in your name, license plate number, and a mailing address. You can write the check when we're done."

I was pledging not to reveal, abandon, or misuse my Acme Little Giants and to return them three years from this date for replacement. Meanwhile, the system was making sure my signature was mine, and my bank account would cover the check I'd write.

"Do people ever forget their pledge?" I asked.

"Not really. Once you've got an Acme Little Giant, you don't want to lose it. The problem is outsiders. A TV crew flew in last month to check out a rumor that some people were using atomic bombs in their cars and did we know anything about it. Funny thing—they had some kind of freak accident flying out of the valley." He meant me to understand it was no accident at all.

I sat there in the office watching the mechanics drain, wash, and remove the gas tank I'd had filled a few hours ago. The "accident" wouldn't have been authorized, of course—someone panicked. As for who tipped off the reporters, well, there had to be a whole lot of collusion going on—not just truckway inspectors but people who install air conditioners and satellite TV antennas for houses with no electricity hookups, or drill deep wells and install electric pumps hooked up to soccer-ball-size mysteries. And it couldn't be only Eastern California, either—the houses might not travel, but the trucks did.

When they finished with my motor home, I drove back to my RV space, unreeled the datacom line from the junction box and plugged it in, then started searching the data bases the telephone company offers access to "for a slight fee." After an hour and a half and $183 of slight fee, I'd located three other places that showed the same pattern as California, and every one of them centered around a place where a secret laboratory had been closed—Richland, Washington; White Sands, New Mexico; and Oak Ridge, Tennessee.

It's like those connect-the-dots things you do as a kid. You get this fact, link it to that number, then connect a couple of trends, another fact, and all at once, there's the picture. The picture I was seeing on my computer screen was well over two million Acme Little Giants powering away in houses, and trucks, and pumps, and the number was tripling every year. You can keep twelve of something secret, but not two million. And that last fact wouldn't save my job, but it might save the Acme Little Giant.

I went outside to unhook the data comm line and plug in the acoustic phone line. I looked to see if Angie was still up, but the windows of her apartment were dark.

My French is limited to simple ideas, like a single room with bath, and explaining myself to layer after layer of scornful Parisians until I reached a manager high enough up to care was not attractive. At least it was Monday morn-

ing in Paris, and someone would be there.

I had to be patient while the corporate operator corrected my French and connected me with one secretary and then another, but the name Northern California Power kept the relay going until I finally reached a secretary to the managing director. One more transfer and I was speaking with him, in English, and he had my maps on the computer screen in front of him.

He asked and I answered. When he asked how many and I said over two million, there was a silence then a quite distinct *"Merde!"*

"The reason I called," I said, "is that the media are likely to be full of news about the Acme Little Giant after today. The people here seem to think that the electric power companies will try to have the Acme Little Giant outlawed. I thought I'd let you know, in case Global was planning to acquire a license to manufacture for markets overseas."

I had nothing else to say, so I unplugged the phone and went to bed, hoping the bait I'd offered was the right one. I told myself I'd wake up at six, but I didn't. It was 7:23 when I finally made it over to the cafe, and Angie was already at work.

"I have to talk to you," I said.

"Oh? You better come into the office, then—I have to make up my shift schedules. It's Monday."

She sat there booting up her computer so that I had to tell her twice about the transponders before she really heard me.

"Maybe they were just worried about you," she said.

"Sure, and maybe pigs fly. No, I think you're right that NorCal and some of the others will try to get the Acme Little Giant outlawed. I want to stop them."

"How?"

"Go public first, right now. Let the world see what the Acme Little Giant really does for people before the other side starts talking millirems and Geiger counters and 'don't radiate my baby.' Let people know there are more than two million of them in use without a single accident."

The computer had been patiently blinking at her to enter data. Without even looking, she reached over and turned it off.

"Two million? Are you sure?"

"Of course not, how could I be? But that's what the statistics look like. Help me, Angie—it's the right thing to do."

"Well you would say that, wouldn't you? What sort of help are we talking?"

I shrugged. "I don't know how to do it. I don't think we can wait for another TV crew to fly in and maybe get killed before they can report it."

"You've been away too long," Angie said. "I know exactly how to do it."

She was dialing as she talked. "That's Jake with our meat delivery out there, Janny—go tell Charlie to check it in for me, will you?" She put her hand over the mouthpiece. "Tell him to weigh every single piece!"

I nodded and, as I left the office, I heard Angie say "Hi, Dr. Dan, it's Angie. Can you spare me a minute?"

She wouldn't tell me what they'd planned, but I didn't have to wait long to find out. About 8:15, the radios popped on in the cafe and everywhere,

beeping the travel warning signal. Only instead of announcing a slide, a wreck, or heavy snow, the voice said: "I have an official message for all you Acme Little Giant owners, on or off the road. Folks, it's time to show the world what country power really means. So if you're in a big rig, shut down your sound effects and turn off your smoker. If you're at home, go out and pull down that fake solar panel or phony windmill. If you work in a garage that does conversions, put up a sign and brag about it! As for all the rest of you out there, take a look around at what you're missing. This is the Voice of the High Desert, doing 50,000 watts straight off our Acme Little Giants, and proud of it!"

The radio went off and I heard somebody say, "Hot damn! No more bribes!" Drivers who'd been in the middle of breakfast were scrambling to get outside, where truck horns were already sounding. Angie and I went out to watch as new trucks pulled in and drivers climbed up and ripped down their exhaust stacks. One driver hitched his sound effects speaker to his disk player and drove up and down the access road using his tractor as a giant boom box. People came out of their motel rooms to watch.

Putting her head close to my ear, Angie said she still had shift schedules to get out. I nodded. There was a steady stream of trucks now, coming from both sides of the truckway.

A lone diesel rig pulled up to the pumps and somebody with a bull horn yelled "Get a horse!" and people laughed. All at once a cold shadow passed over me. I heard the roar of a jet coming in to land—a jet with a Global logo on the tail. I knew how a chicken feels when a hawk is near.

I went back in. The cafe was empty except for two men by the window and Angie, who was picking up the money the drivers had dumped on their tables. One man had his arm in a cast and the other was sitting stiffly upright, as if his ribs were taped. The man with the broken arm saw me looking at them and turned away. I sat down in a back booth.

Where were they? It didn't take that long to walk over from the landing strip.

Finally Twomey came in by himself and went directly to the two men by the window. I couldn't hear what they were saying and I was too far away to lip-read. Twomey kept glancing out at the celebration, asking questions and nodding. At last he got up and came over. Angie darted across and asked if I needed anything.

"Like police protection? No, Mr. Twomey won't stay long."

He wiped off the table top before he put his arms on it, wholly unaware that Angie was glaring holes in him.

"I suppose you think what you did was funny," he said.

"Well, you know us older single ladies. We get a bit defensive when strange men are after us."

His face was getting red. "I meant that radio announcement. Shall I tell you what's going to happen?"

I shrugged. "Canadian maples will grow back, northern lakes will have fish again, and the greenhouse effect will taper off."

He got redder still. "Always the smartass. No, Janet. Your Acme Little Giant has never been approved for sale

and we have reason to think they misused classified information in designing it. The old man is in Washington, having lunch with the deputy head of the Nuclear Regulatory Commission right now. In about two hours, NRC inspectors and federal marshals will show up to ask some hard questions. We picked up a TV news crew and brought them along so the whole country can see the answers."

I had lost. But how could I? Global didn't need either the rural west or independent truckers—both were small change. And the world market for Acme Little Giants was huge enough for a dozen Globals! Surely they wouldn't let one subsidiary organize an attack that would jeopardize—

Len came into the cafe so anxious he was almost tap dancing. He spotted Twomey and hurried over.

"I've got the old man on the phone from Washington. He never got to the NRC—Paris called us off. He wants to talk to you."

I hadn't lost, Twomey had. I gave his hand a motherly pat. He snatched up a napkin to rub the touch away as the two of them headed for the door.

That night, the news programs showed several truckstop celebrations (including Angie's, courtesy of Twomey's news crew), a brawl between company drivers and independents at the Paso Robles truckway entrance, and some odd shots (an electrically heated orange grove, a homebuilt industrial robot winding armatures in a Tennessee barn). Angie and I were sitting upstairs in her living room, sipping martinis she'd made in the cocktail shaker I'd given her the day she turned twenty-one.

"The world won't end if the squatters around Wild Horse Spring don't send their kids to school," she was saying, "and diesel mechanics can learn another trade—ours have. I don't see why you have to keep on worrying."

"It's what I do."

"Did—you're retired, remember?"

"No I'm not, I'm merely unemployed."

She made a face and trotted to her kitchen. "You know what your trouble is?"

"Yup."

I could see her reflected in the window. She was dumping the rest of her martini and getting a diet soda instead.

"You don't live in the now," she said. "You're always looking for what's coming."

I moved a little so I could look out at the lights scattered across the valley floor and the river of light that was the truckway at the far south end. How many of these independents had counted on keeping their edge long enough to finish paying off the rig?

Even if the Acme Little Giant did harm, it was worth saving because it opened new options. The boy with the rifle knew that. A year ago he'd been a prisoner of grownups; now he was a hunter and a warrior. It may not be civilized to shoot a jackrabbit, but it's not easy, either. It's not easy to move to a place the developers haven't softened yet, where there are hidden mine shafts with rotting covers, rattlesnakes, slopes whose rocks shift under your feet, and no signs that say "Walk"/"Don't Walk."

"You want another martini?"

"No thanks, I'm going to turn in. I

want to get on the road early tomorrow."

Maybe if we loosen the controls and let our civilization unravel a bit, we can reknit a fairer social fabric—one that needn't depend so much on jails, for instance. It's worth a try. ■

# IN TIMES TO COME

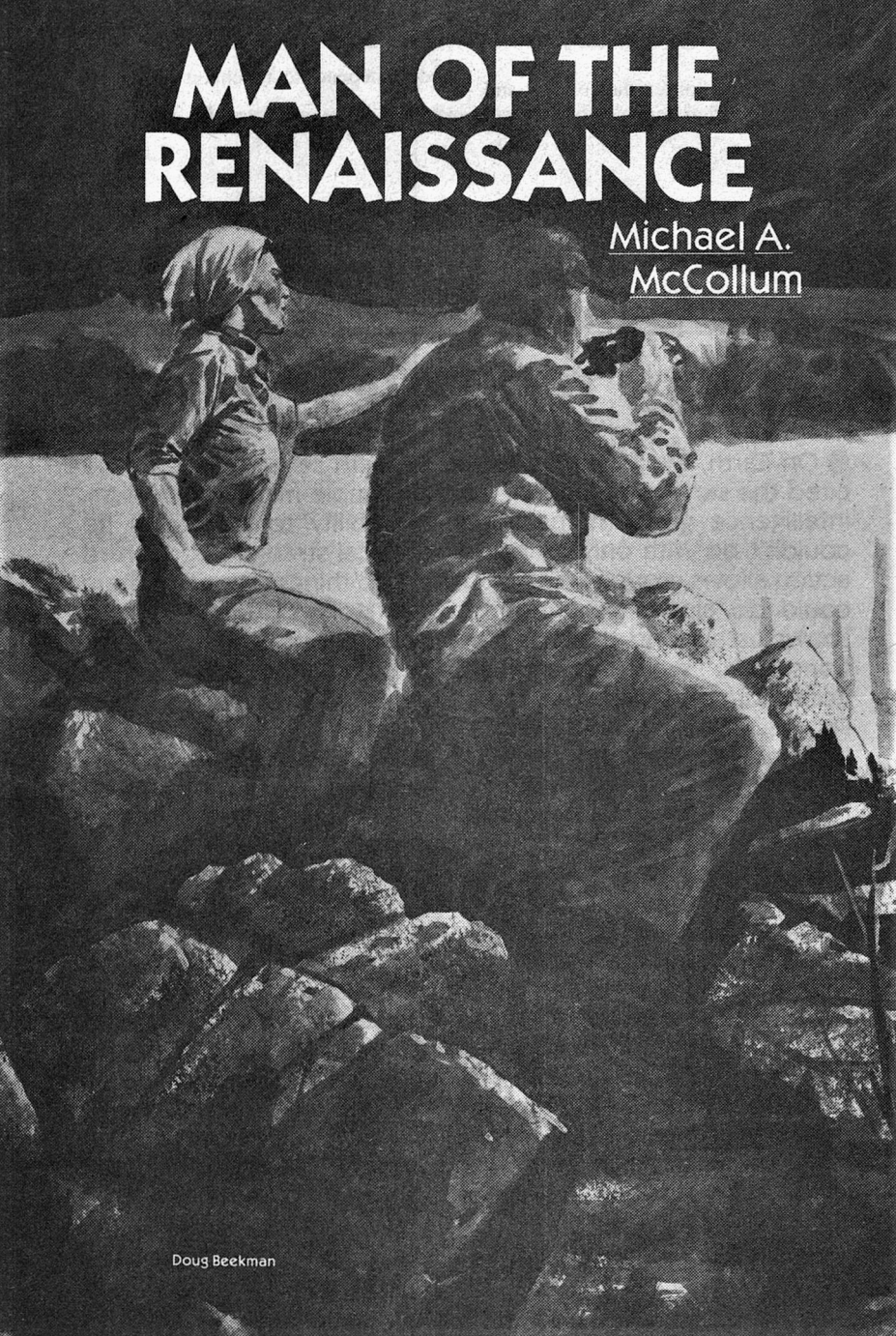
● On Earth, evolution has come up with several ways to exceed the survival abilities of a single, simple-minded organism. Intelligence gives an individual the ability to do things he couldn't do with only his built-in physical strength; concerted action allows groups of individuals to do things no one of them could do alone. Next month's lead story, "Hunting Rights," shows us a world that has gone beyond both those adaptations, to . . . well, wait and see. For now, I'll say only that the ecosystem on this planet came up with one very widespread, very useful ability—and that it's brought to you by the imaginations of P. M. Fergusson and G. L. Robson, with a suitably fearsome cover by Janet Aulisio.

Our May issue will also feature the concluding half of Michael F. Flynn's "Introduction to Psychohistory," and a sequel you may have anticipated to a story we published in our October 1987 issue. In Kevin O'Donnell, Jr's "The Million Dollar Day," a man called Fradero spent a large part of his life in a field where decades passed during a single day "outside." He planned to return to "normal" life armed with a great familiarity with the world, because he had lots of time to study it while it had little time to change. You may have thought, as I did, "But *he* changed. . . ." And therein, of course, lies another tale—"Fradero Goes Home"—which O'Donnell tells next month.

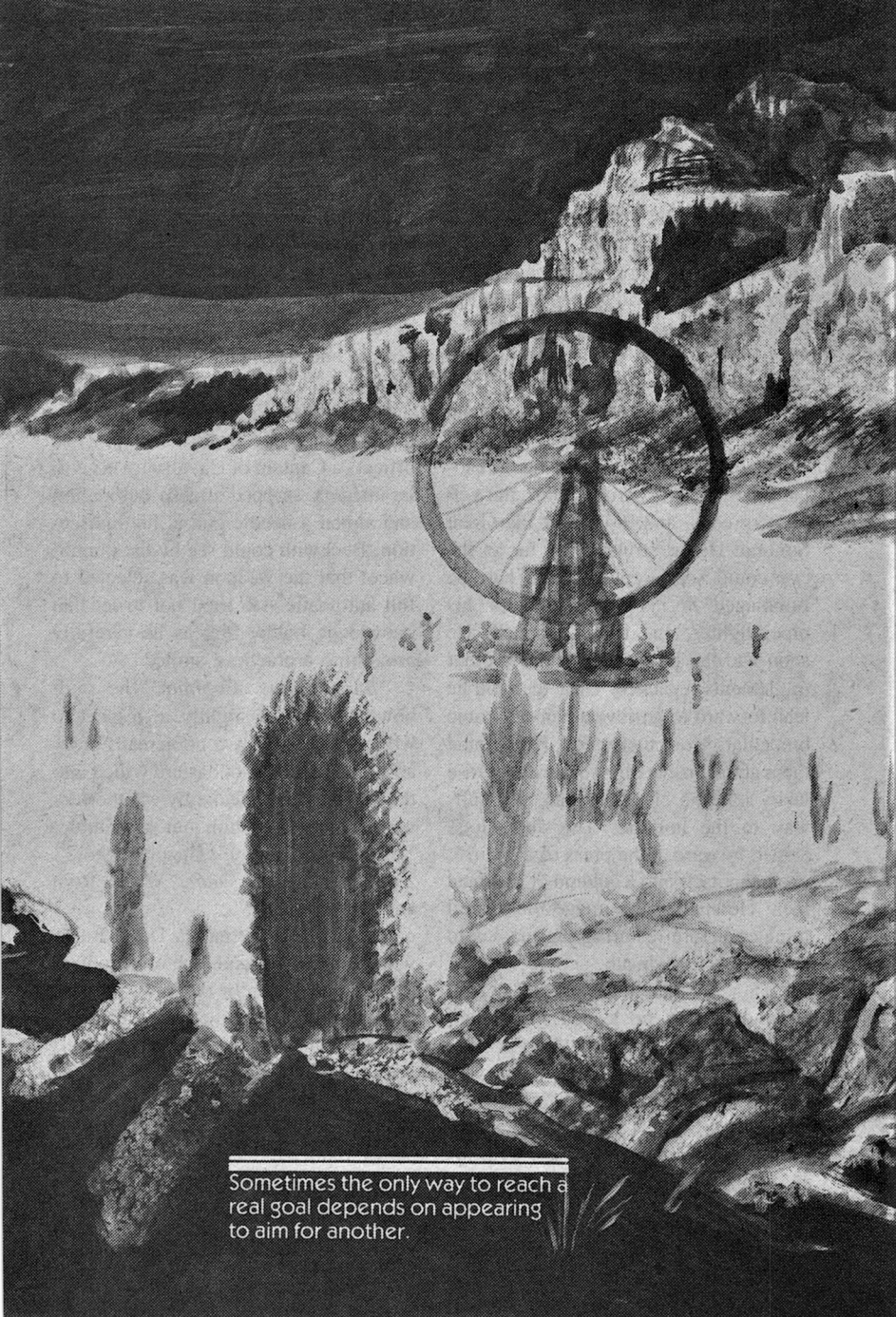
In addition, we'll have stories by such reliable scribes as Roger MacBride Allen, Eric Vinicoff, and that slippery chronicler of the even slipperier Kelvin Throop, Rowland Shew.

# MAN OF THE RENAISSANCE

Michael A. McCollum



Doug Beekman


Sometimes the only way to reach a real goal depends on appearing to aim for another.

Darol Beckwith guided his steed over rocky ground, carefully threading his way among scrubby palo verde trees and yellow stands of cholla cactus until he gained the summit of the small hill that had been his goal for the previous quarter hour. Once on top, he reined in his horse. Behind him, two heavily laden pack mules stopped in their tracks, each taking quick advantage of the opportunity to crop at the few patches of wiry, yellow grass that poked through the carpet of fist-sized stones.

Beckwith removed his salt-stained hat and wiped perspiration from his forehead onto the sleeve of his threadbare, cotton shirt. Around him, the yellows, greens, and browns of the Great Sonoran Desert stretched as far as the eye could see. Replacing his hat, he rummaged in his saddlebags for his pipe, lighter, and tobacco pouch. He soon had the pipe alight and the other implements repacked. Only then did he lean forward to retrieve a pair of 'tronic binoculars from their case. He pointed them at the brown pillar of dust that rose lazily into the cloudless blue sky halfway to the horizon. The dust cloud leaped forward at the press of a control, resolving itself into a column of mounted men. He studied the image for several minutes before restoring the glasses to their protective sheath.

"They're Sonoran cavalry, all right," he muttered as he leaned forward to stroke his horse's neck. "Vargas's report was right about that. Wonder what they're doing this far north?"

The horse's answer was a short whinny as Beckwith urged it forward with his spurs and began picking his way toward the level ground of the plain below. He made no effort to avoid the patrol, but rather rode straight for it, reining in when the file of horsemen was less than a kilometer distant.

It didn't take long for them to spot him. He puffed on his pipe and watched the Sonoran envelopment unfold with professional efficiency. He counted thirteen in all—an officer and a dozen enlisted men—as he became the center of a cloud of roiling dust, milling horses, and men with rifles drawn and ready.

He bit down on his pipe and lifted his hands well away from his body. The officer, a Captain of Cavalry by his collar insignia, stopped directly before him and aimed a needle gun at his midsection. Beckwith could see by the thumbwheel that the weapon was selected to full automatic. He tried not to let that knowledge bother him as he carefully broke into a practiced smile.

"*Buenos días, Capitán,*" he said, bowing his head slightly in respect to what was obviously a nobleman, probably a younger son or bastard willed into the service of the Duke by a father determined to keep him out of trouble. "To what do I owe this singular honor?"

"Who are you, *señor?* Where from and where bound?"

"Beckwith's the name. Darol Beckwith. I'm the circuit doctor for these parts. Most recently out of California Free Republic, bound for the village of Nuevo Tubac on my yearly rounds . . . and damned if I expected to see Sonorans this far north."

"When were you last in the Republic, *Señor Médico?*"

Beckwith reached up to pull the pipe from his mouth and then lazily scratched

at his week old growth of beard. "Let's see now. I stopped for a week in New Refuge before crossing the river at Blythe, six . . . no, seven . . . yeah, seven days ago."

"Did you see any soldiers there?"

Beckwith let his smile degenerate into a sheepish grin. "Now, Captain, you know that my service doesn't take sides in local politics. It would be a violation of my oath to answer such a question."

"Perhaps you would prefer walking to Nuevo Tubac without your boots?"

Beckwith raised one eyebrow. "Has His Imperial Majesty, Moctezuma VII, decided to abrogate his sworn oath given in the Second Treaty of Hermosillo? Or is this the Duke of Sonora's idea? Is it now the policy of the Empire to harass Doctors of the Service wherever found?"

"His Majesty does what he wishes, *señor;* and My Lord, the Duke, is his strong right arm."

"Then I guess I'd better give you my boots and start walking, for I will not answer. I assure you, by the way, that my response will be the same when the California border guards ask me about you when I cross back over next fall. I am but a harmless medic trying to get on with his job."

At this last, the captain's eyes dropped to the polished-by-use wooden stock of the automatic rifle scabbarded beneath Beckwith's right knee. Beckwith followed his gaze, and shrugged.

"Even a doctor must ofttimes defend himself in the wilds. All my instruments are on my pack animals, and would bring a goodly price on the black market in Mexico City."

At the mention of the pack animals, the captain holstered his needle gun and gave orders to a burly noncom. The *sargento* leaned forward and took Beckwith's lead rope from him. A few more quick orders in the local patois—a corrupt version of Spanglish—and the doctor found himself disarmed. The patrol formed around him and the whole party clattered off in a southeasterly direction.

Beckwith took the opportunity to study the men around him as he rode among them. Everything about them —their lean, watchful look; their dusty, sweat stained uniforms and dirty sombreros; the straight-backed way they rode their horses—told him that they were regulars. That, too, confirmed Vargas's initial report. The insignia they wore identified them as the Second Hermosillo Dragoons, one of the Duke of Sonora's best regiments.

The men themselves were a varied lot. As Beckwith had already noted, the captain was a mustachioed young dandy of nearly pure Hidalgo stock. His troops, however, ran the gamut of humanity. Several pairs of blue eyes stared from out of reddened, sunburned faces above blond beards; indicating that their owners were descended from the vast wave of refugees that had swept down from the north eighty years before. Other members of the patrol sported *indio* and *negro* features, and one was a caucasian-oriental mix. All looked as though they knew their business.

It was late afternoon when they entered the pueblo of Nuevo Tubac in the Gila River Valley. The town sat on one bank of the stream whose position was marked by a darker-green swath cut through the yellow-green of the desert vegetation. He took in the signs of the Sonoran occupation with experienced

eyes, while appearing to have no interest beyond finishing the long dirty joke which he had been spinning for his companions. He didn't like what he saw. If the main street of this little hamlet contained a representative sampling of the imperials' strength, they must number at least four troops of cavalry and an unknown number of support personnel. That was a big chunk of manpower for Juan Pablo Andros, the Duke of Sonora, to send this far north—especially considering the other claimants-of-the-moment for his throne.

Obviously, the fact that he *had* sent them north was convincing evidence that he had some overwhelming reason for doing so. Beckwith cursed the fates that had prevented Vargas from finishing his report. Whatever had happened, it had been no mechanical failure. A clear carrier wave had ridden the satellite channels for almost three minutes after Vargas's voice link had been silenced.

The patrol did not stop at the village square as Beckwith had expected, but rode through the inner defense wall and into the courtyard of the hacienda belonging to Don Ynicente Galway, *Patron del Pueblo*. Beckwith had spent many an enjoyable evening in that great rambling structure, playing chess and arguing philosophy with his host. He hoped the old pepperpot hadn't objected too strenuously to Juan Pablo's henchmen taking over his home. Beckwith had too few true friends in this world as it was. He would hate to lose two in the same month.

The captain led him through the fortified outer door and into the gloomy interior of the hacienda, stopping only when he arrived at the door of Galway's study. He knocked briskly and waited for a muffled order to enter. Inside, sitting behind Galway's desk—a prized pre-war antique—was a general of the Imperial Mexican Army in full regalia. His chest was covered with more medals than Beckwith had ever seen before in one spot. More important was the fact that the general was Moctezuma's man (not Juan Pablo's), and that he was commanding Sonoran troops.

After the captain had finished his report, the general, a rotund, mustachioed man with hard eyes, waved dismissal and the Sonoran officer spun briskly on his heel and marched out.

The general leaned back in the squeaky swivel chair and regarded Beckwith for a moment in silence. The doctor stood his ground, coolly returning the stare.

"I am General Miguel Stefan Trujillo of the *Militar de México*," he said, finally, leaning forward to rest his elbows on the desk's polished surface. "You are the traveling doctor for this village?"

*"Sí, Señor General."*

"I would have expected an older man."

Beckwith shrugged. "Riding circuit requires the stamina of youth, General. Do not fear. I began my training at age twelve. That was twenty-five years ago. I assure you that I am highly skilled in my craft."

"Why is it that none of your patients informed us that you were due at this time?"

Beckwith shrugged. "Probably because none of them knew it themselves. I'm late this year. Got hung up fighting

an outbreak of Blue Plague up in the Navajo Nation last fall and I've been rushing to catch up ever since."

"*La peste!*" The general crossed himself with his right hand and made the sign of the Mushroom Cloud with his left. Beckwith wondered what the Archbishop of Mexico City would think of such an overt appeal to paganism in one of His Majesty's highest ranking officers, a comment he carefully refrained from making out loud.

"There is no danger, General. I've been vaccinated and if it hadn't taken, I would have been dead six months ago."

Trujillo's expression quickly turned to anger, obviously fueled by the thought that he had made a fool of himself before this stranger.

"Be that as it may, *Señor Médico,* I find myself wondering at the timing of your current visit."

"If you will pardon me for saying so, General Trujillo, it is I who should be wondering at your presence, not vice versa."

"My presence here does not concern you."

"It concerns me if it interferes with my work. I got the impression from Captain Rodríguez that I am to consider myself your prisoner."

"His Imperial Majesty would never imprison a representative of the Public Health Service, Doctor. You are our honored guest."

"Will I be allowed to practice my craft freely?"

"Certainly. I will even assign an officer to assist you."

"Will I be allowed to leave when I am finished in this village?"

"I'm afraid not," Trujillo said. 'You will to remain as our guest until we complete our work here."

"How long will that take?"

"As long as it takes."

"I was forced to lecture your junior officer concerning Mexico's obligations under The Treaty. Must I do the same for you, General?"

"His Majesty has authorized me to take special measures on my current mission, Doctor. If you are inconvenienced, your service may petition His Majesty for compensation. Now, then, if you will excuse me, I have much to do."

Beckwith turned to leave.

Trujillo glanced up from his paperwork. "One thing more, Doctor. I would be honored to have you for my guest at dinner this evening. Señora Galway sets an excellent table and I am always interested in tales of far-off places."

Beckwith blinked, seemed about to refuse, then relented. "I would be delighted."

He turned to leave once more, his expression dour. He was well out in the hall, following a uniformed flunky toward the stairs that led to the hacienda living quarters, before he allowed himself the barest hint of a smile.

Phase One had gone as planned!

Beckwith followed the aide to the upper part of the house and found himself in the same bedroom he had occupied on his last visit. He busied himself unpacking the leather satchel he found in the room. He noted signs of a hurried search of his belongings as he did so. A few quick glances inside the

case assured him that the seals on the false bottom that hid his "special equipment" were unbroken. He placed his clothes on the pegs set into the adobe walls for the purpose. He had just finished laying out his shaving kit when there came a quiet knock on his door.

He opened it to find Esperanza Galway standing in the hall with a load of linen. She curtsied politely and brushed past him, all the while keeping her eyes averted as was considered prim and proper for a young lady hereabouts. She placed the linen on the feather bed and turned to face him as he closed the door.

"It is good to see you again, Doctor Darol."

"And you, too, Espe. By the Great Gods of Fission, you are sprouting up like a weed! It won't be long before the young grandees will be beating the doors down."

Espe blushed as Beckwith nodded approvingly. Gone was the gangly little girl whose arm he had set five years ago. In her place was a blossoming young woman of nearly fifteen summers. Espe was one of those lucky people who seemed to have extracted just the right characteristics from her mixed bag of ancestors. She was fast becoming a beautiful young woman.

"How is your father?" Beckwith asked.

"Safe, as far as I know," Espe said. "He left for Taos to buy breeding stock last month and has not returned."

"And your mother?"

"Very angry at the Mexicanos for tracking mud all through her house."

"Did that potion I left help her tuberculosis?"

"She is much improved."

"What of my other patients?"

"Carmen had her baby, a strong, young boy with healthy lungs that can be heard all over the pueblo. And Aldo Finessa's arm has regenerated as good as new. Other than that, not much has happened except for the Sonorans."

"What of old Manuel Vargas? Does he still suffer from shortness of breath?"

"You haven't heard?"

"Heard what?" Beckwith asked. "I just got here, remember?"

"The Sonorans killed Manuel Vargas. They say he was a spy. They found him with a *machine*. Some say that it was a radio."

"Radio? Where would old Manuel get a radio? And for whom would he spy? And what would he spy on out here in the middle of all this desolation?"

"I do not know. All I do know is that the fat *generalissimo* was most unhappy. It is said in the village that he had two of his own men shot when he learned that they had killed Vargas."

"Nice people," Beckwith muttered. "Why'd they come to the Gila Valley, Espe? This is poor land, barely able to support the people who live on it. Surely old Moctezuma can't want to add this place to his Empire."

"I do not know, Doctor Darol. They have four horse troops and *los ingenieros* with them."

"Engineers? Any power machinery?"

Espe nodded. "Two large steam wagons with drilling attachments. Also, things like a prospector's metal detector."

"Metal detectors, huh? Did you see any radiation counters?"

Espe nodded. "Yes, a few. In the twenty days since they arrived, they

have set off many explosions near the old charcoal ovens east of town. What does it mean?''

Beckwith shrugged. ''That they're on a treasure hunt, I suppose. I wonder what they are looking for? Maybe I'll ask the General at dinner tonight.''

''The ancients were a pack of god-damned fools!''

General Trujillo wiped at his plate with a crust of coarse bread, soaking up the last of the pinto beans while daring his double handful of assembled subordinates and unwilling guests to disagree with his comment. He was not disappointed when a priest across from Beckwith crossed himself and muttered a silent prayer.

''Ah, our *Padre* thinks otherwise,'' the General growled, his speech slurred by too much wine.

''Our Lord looks not well on those who blaspheme the dead, Miguel Trujillo.''

The general turned to Beckwith. ''What say you, Médico? Our ancestors blew up the world in a fit of pique. Should we regard them as near demigods on that account?''

Beckwith wiped his mouth on his sleeve and belched politely before answering. Esperanza Galway peered at him with alert eyes from the chair next to the priest's. Her mother, La Donna Alicia Galway, maintained a stony silence from the foot of the table.

''The ancients were neither fools nor demigods, General. They were men like ourselves, with all the weaknesses and strengths to which mere mortal flesh is heir. If they had a fatal flaw, it was that they weren't wise enough to extricate themselves when they fell into one of the universe's traps.''

''Trap?'' the General muttered. ''What are you talking about, Médico?''

''Why, the trap of nuclear weapons, General. What else would I be talking about?''

The priest folded his hands in a prayerful gesture, ''It is refreshing to meet a medical man who is also an adherent of the teachings of the church, Doctor Beckwith.''

''You misunderstand, *Padre*. Whether nuclear weapons are the spawn of the devil is a point which I happily leave to you clerics. No, the trap to which I refer is the obvious fact that they are too damned easy to build.''

''You're crazy!'' the Captain of Ordnance who was Trujillo's second-in-command said from Beckwith's right. ''The Manhattan Project was one of the most complex ever undertaken. How can you call what they did *easy?*''

''I do so, Capitan Villela, because the men who invented the bomb accomplished their feat with the aid of mechanical calculators and vacuum tube technology. They knew nothing of semiconductors, lasers, magnetic containment devices, or dozens of other machines available to pre-Catastrophe civilization. In outlook they were closer to the engineers of Queen Victoria's time than they were to the hi-tech warriors of The Catastrophe. That they were able to succeed with their relatively primitive technology is an indication of the ease of their task.''

''Your point, *Médico?*''

''Why, that nuclear weapons were invented too early. Humanity wasn't ready for them. Had the task been sig-

nificantly more difficult, it would have taken longer. That would have given us more time to mature as a species and to develop countervailing technologies. As it was, the weapons of mass destruction were introduced into a world woefully unprepared to deal with their consequences."

"They were more prepared than are we," the priest argued.

"Not necessarily, *Padre.*"

Captain Villela blinked. "Surely, *Señor* Doctor, you are not suggesting that we are more advanced than the ancients?"

Beckwith shrugged. "Not in all ways, certainly. Not even in most. But in some."

"What ways, Doctor Darol?" Espe asked.

"Many ways, Espe. If Aldo Finessa had been mauled by that javelina boar a hundred years ago, the most advanced hospital the ancients possessed could have done little more than amputate his arm. Yet, it was not a difficult matter for me to achieve full regeneration. Or cancer, the most dread disease of the ancient world. I can cure it as easily as the common cold. We have come a long way since the days of The Catastrophe, and not only in the field of medicine. Of course, we have an advantage that previous generations did not."

"Advantage?"

"A very great advantage if you think about it. Post-Catastrophe civilization is the first ever blessed with the sure knowledge of what was once possible. And sometimes, while searching for the old secrets, we uncover new ones.

"Our ancestors built a civilization of factories and assembly lines, of massive industries and even larger bureaucracies to control them. We, on the other hand, are a world of cottage industries and master craftsmen, where each machine is the work of a single individual or a few dozen people at most. We are a society that specializes in prototypes rather than mass production.

"We are also more efficient than they were . . . of necessity. They left us too poor to do things their way. In the long run, who is to say which is the better road to travel?"

"Then you are not one who believes the race is in its twilight, *Médico?*" the general asked.

"Not at all. As I see it, our situation is somewhat akin to that of Europe after the fall of the Roman Empire."

"*Roman* Empire?"

"You might say an earlier *Estados Unidos*, General. A culture which in its time ruled much of the world."

"The city of Romulus and Remus, Julius Caesar, and Benito Mussolini," Espe said, nodding.

Beckwith beamed like a proud parent. "You've seen the collection of ancient books in your office, General? Ynicente Galway was a scholar of some renown in his youth. I am predicting that his daughter will surpass even his accomplishments someday."

"Most unusual," the general said, his tone betraying his opinion of the usefulness of teaching women to read. "You were saying . . ."

"Oh, yes, the First Dark Ages! They were a time in history with parallels to our own situation. Then, as now, the world was a collection of warring fiefdoms, with no nation strong enough to enforce its will on its neighbors. The

result—as now—was a growth of feudalism and a certain lack of stability. Yet, the human race continued its technological advance right through the middle ages. Those years saw the invention of the horse collar, the stirrup, the lateen sail, and the first truly efficient plow—all significant advances over Roman technology."

The dinner conversation continued for more than an hour. Beckwith had hoped that the wide ranging discussion he'd started would cause one of the Sonorans to slip and make a remark that would be a clue to their purpose here. No such luck. The conversation had never risen above the level of a polite debate comparing the present with the "good old days."

Eventually, Beckwith concluded that most of his dinner mates really didn't know what was going on—not surprising if the powers-that-be back home were right in their suspicions. So, just when the conversation was beginning to lag, he reached into his repertoire of anecdotes and told a funny story. One advantage of the current state of world communications was that jokes didn't age as quickly as they once had. He had his listeners chuckling in a matter of moments.

The crackling mesquite log in the fireplace had burned low when he finally asked to be excused and started toward the rear of the hacienda. His demeanor showed no sign of the adrenaline storm that raged in his bloodstream. For if his probing had stirred the general to suspect that he was more than the traveling medic/storyteller/troubadour he pretended to be, this was the moment of greatest danger.

No lurking guards stepped out to bar his way, no shots rang out of the darkness, not even the hacienda dogs bothered him as he crunched along the graveled pathway at the rear of the house. He quickly finished taking care of necessities in the hacienda outhouse, and stepped back into the cold night air of the desert.

He paused to light his pipe. The lighter was a flare of blue against the yellow lights emanating from the hacienda windows. He puffed quickly, and was rewarded with the bitter taste of tobacco smoke on his tongue. He drew in a lungful of the smoke, then exhaled slowly. As he did so, a bright light just above the northern horizon caught his attention. He stepped out of the shade of the trees to get a clear view as the familiar star began to climb the sky.

Beckwith's internal alarm clock woke him two hours before dawn to a pitch black world lit only by star shine. In spite of the heat of the previous day, the night air was brisk against his bare skin, causing him to shiver at the thought of throwing back the covers and leaving the warmth of his soft bed. He stalled the inevitable for a few moments by remembering the bright star he'd watched cross the heavens the previous evening.

By rights, The Catastrophe should have ended all life on Earth. That it had not was a tribute to the overlapping layers of orbital fortresses and satellites which the two pre-Catastrophe superpowers had built with such laborious care over a thirty-year period. When finally the world had gone insane and the missiles began to fly, fewer than one

in fifty warheads survived to explode against their intended targets. The other forty-nine had either been destroyed with their carrier missiles, in transit through the vacuum of space, or in the final seconds of their terminal maneuvers.

Coordinating the defenses had been the great manned battle stations. The greatest of these was *High Citadel,* the prime command-and-control facility for the western alliance. First constructed in the early years of the twenty-first century, *High Citadel* had been constantly enlarged, strengthened, and improved. In addition to being the nerve center for all western orbital defenses, *High Citadel*'s computers had been used to archive all manner of scientific and technological data.

During the six weeks the war lasted, *High Citadel* had defeated everything the eastern bloc could throw against it. It had destroyed the east's own system of orbital fortresses in a duel that had turned night into day across the entire face of the planet. Finally, it had directed the strikes that destroyed the eastern bloc's surviving missile fields, and thereby brought about a cessation of hostilities.

The end came too late to save technological civilization. For, even though the orbiting satellites and defense stations had saved the human race from extinction, sufficient megatonnage had gotten through to smash the industrial base on which civilization was built. In less than a year Earth was swept by successive waves of famine and plague. Those men and women still in orbit watched as their world disintegrated into ever smaller warring groups. These orbiting warriors were finally forced to abandon their posts as food, water, and air ran low. One by one, their emergency craft departed *High Citadel* to slip below the roiling clouds of Earth, never to return. For eighty years, the deserted battle station's anti-laser armor had reflected the rays of the sun with mirror brightness, making *High Citadel* one of the brightest stars in the terrestrial sky.

The sound of a distant cat fight brought Beckwith back to the problem at hand. Unable to postpone it any longer, he slipped out of bed and groped in darkness for his leather case. His fingers quickly found the hidden catches that freed the false bottom from the valise. He withdrew a garment from the secret compartment. What little radiance fell through his open window was just sufficient to show the darksuit to be a pool of deeper black against the near stygian dark around him.

Beckwith carefully climbed inside, zipping the light amplifier hood over his face as a last step. He was now encased in shadow, able to see, but not be seen.

He turned back to the case, working more quickly now that the world was lit in a bright, greenish glow. The hidden compartment yielded up a holster and needle gun which he belted around his middle. Two small rectangles the size of dominoes went into his breast pocket. He visually inventoried the half dozen tiny vials in the bottom of the case, checking them for any telltale signs of breakage before carefully resealing the hidden compartment. The floor boards creaked slightly as he moved to the open window.

There were two guards roaming more or less at random through the courtyard

below. Both were fairly distant from the hacienda and Beckwith took advantage of this good fortune to lever himself up onto the hacienda's tiled roof. Once there, he cat-footed his way to the far side of the building, the side closest to the Sonoran bivouac. After a moment's hesitation at the edge of the roof, he concluded that his best avenue of approach was atop the village wall. Better to be silhouetted against the black sky than the whitewashed walls of the town—assuming that he didn't break his neck in the process.

He thanked the Gods of Fission that this village was too poor to top their wall with metal spikes or barbed wire as he moved in a balancing act *cum* hundred meter dash along the narrow, impromptu footpath. In a matter of seconds he found himself overlooking a small sea of tents.

The Sonoran encampment was a sturdy little fortress with an air of permanence about it. On one side the conquerors had used the village wall—the same wall where Beckwith now squatted. Everywhere else, they were building new walls from native rock cemented together with adobe. By the progress they had already made, Beckwith judged their annexation of Nuevo Tubac would be complete within another month.

The thought left a sour taste in his mouth. He liked Ynicente Galway and the people of this village. It would be a tragedy to see them fall under Juan Pablo's iron heel. The real tragedy, of course, would be losing Esperanza Galway. He had watched that precocious little girl for nearly ten years now with an interest far from avuncular. The Public Health Service's greatest need was for good people and Darol Beckwith had planned to recruit Espe Galway for the training academy on his next visit. Now there was a good chance that would never happen. Keeping this one pueblo out of Sonoran hands wasn't his concern at the moment. Nor was securing Espe for the service. His current mission went far beyond the mere delivery of a few hundred likable people from the bonds of slavery.

Beckwith slid down from the wall, chiding himself for the nasty tendency towards morose thoughts he had developed lately. Then he hadn't time for such thoughts as he padded quietly between rows of tents, slowly making his way toward two large machines parked at the center of the encampment. A tall antenna mast rose between them.

He hid among the tents, acutely conscious of the snores around him, and gauged the moment when the two guards pacing in front of the silent machines would be at the farthest reaches of their circuits. Then it was a swift, crouching run through a dark gap between watch fires, and a rolling dive into the shadows beyond.

The steam wagons were nothing like the pictures of the ancients' sleek machines he had seen. They were both large flatbeds, with their alcohol powered engines mounted toward the back near the drilling fixtures. The whole of the wagon bodies in front of the main tiller was covered with canvas. Beckwith pulled himself aboard one, being careful not to dislodge the loose equipment scattered haphazardly around the floorboards. Once inside, even his light amplifiers were of limited use as he

found himself groping in murky surroundings.

His first stop was at the ancient radio set that was perched on a built-in shelf on one side of the steamer. As expected, the radio was a pre-Catastrophe model, its black plastic case cracked and its battery pack trailing an unsightly cluster of wires. Beckwith removed a screwdriver from his pocket and quickly opened the back of the transmitter to reveal the integrated circuitry inside. He removed one of the dominoes from his pocket and wedged it into the radio's power supply. He then hurriedly replaced the back of the case.

Sometime tomorrow, after the radio had worked for several hours, there would be a quick crackling noise and a puff of smoke from inside the circuit enclosure. When the Sonoran operators opened the case, they would find fused and twisted circuitry, the apparent victim of a massive short circuit. With any luck, they would mark the failure as one of old age. Whether they did so or not, however, it was vital to the success of Beckwith's mission that contact between the Mexican expeditionary force and their emperor be severed.

After replacing the radio on its shelf, Beckwith quickly searched the steamer for spare transmitter parts. He poked into various boxes with the beam of a tiny flashlamp, cataloging items by sight and feel as he went. He quickly found the metal detectors and radiation counters Espe had spoken of. He also found what appeared to be a jury-rigged seismograph from pre-Catastrophe days in one corner. Next to it lay a pile of recordings. Apparently, someone was very interested in the geological formations in this area. Maybe the Sonorans were prospecting for oil!

He considered the possibility. True, the ancients had pretty well drained the planet of the legendary stuff, but who knew? There might still be a pool or two around for the taking.

He photographed everything and slipped outside, intending to give the other steam wagon a thorough going over. He changed his plans as he caught sight of the burgeoning glow on the eastern horizon. It would be light enough for naked eye seeing in another half hour, and by that time, he planned to be safely back in his room.

"All right, Espe, what are *tinea?*"

"*Tinea* refers to a group of common fungus infections, Dr. Darol; also known as ringworm. The fungi involved are *Microspora, Trichophyton*, and . . . uh, . . . *Epidermophyton. Tinea capitis* is ringworm of the scalp; *tinea cruris*, of the crotch; *tinea pedis*, of the feet."

"And how does one treat these very itchy problems, Espe?"

"By direct application of any one of several antifungal agents, including . . ."

Beckwith smiled. "Never mind. I should have known that you would keep up with your studies. You'll make a fine doctor someday."

"Do you really think so, Dr. Darol?"

"I wouldn't have said it if I didn't," he replied gruffly. "Now go get me a bucket of hot water so we can get this place cleaned up."

Beckwith and Espe Galway had spent the morning preparing one room of Nuevo Tubac's small church for the traveling doctor's use. One of Ynicente

Galway's large mahogany tables had been moved there from the hacienda, and draped in cloth that had been boiled in disinfectant. A similar cloth covered another table on top of which several of Beckwith's instruments were neatly arranged. Battered instrument cases marked with a caduceus were piled in a corner. On their covers were stenciled the words:

PUBLIC HEALTH SERVICE
"In Service to Humanity"

Beckwith and Espe had worked through the morning and were ready to begin the sterilization process as time for the noon meal approached. It was the third year that Espe had acted as Beckwith's nurse, and she went about the preliminaries with the practiced touch of a veteran. As Espe left the church to retrieve an iron kettle filled with steaming water, Captain Villela entered the examination room and gazed around in interest.

"Good morning, Doctor Beckwith," the captain-of-ordnance said. "The general sent me over to see how you are getting along. I trust you have all that you need."

"Thank you, yes," Beckwith replied. "We're about to disinfect the examination room."

"So I see. I'm surprised that you go to the trouble of individual diagnoses. I always thought that you public health people were interested in water supplies and hygiene, and left the actual laying on of hands to others."

Beckwith shrugged. "We circuit doctors tend to be jacks-of-all-trade, *Captain*. And while our primary duty is to insure the health of a community through public hygiene, we also dabble in individual cures."

At that moment, Espe returned with a kettle full of boiling water from the fire where Beckwith had sterilized his instruments.

"Will that be all, Captain Villela?" Beckwith asked as he prepared the water by measuring out a few drops of disinfectant into the kettle.

"Yes, Doctor. Let me know if you need anything."

"Thank you, I will."

Beckwith watched the officer stride out into the bright sunshine before turning to Espe. "Shall we begin scrubbing?"

After twenty minutes of hard labor, Beckwith called a halt. The two of them sprawled on the floor and examined their handiwork.

Espe looked at Beckwith, her black eyes regarding him seriously, and said, "Doctor Darol."

"Yes, Espe?"

"I've been meaning to talk to you about Manuel Vargas."

"What about him?"

She leaned close and lowered her voice to a whisper. "Sometimes when he would get drunk, Old Manuel would say things."

"What sort of things?"

"He would hint that you and he were the only two who knew a great secret."

"Oh?" Beckwith asked, his eyebrows rising in inquiry.

"He would never tell anyone anything, you understand. He'd just keep muttering that you were the only one who appreciated him. I didn't think anything of it until they caught him with that radio."

"You said yesterday that it might have been a radio. Now you're sure?"

She nodded. "The fat *generalissimo* had it on my father's desk, looking at it, when I took him his lunch one day. It was a radio all right, although unlike any I've ever seen. There was a black box with LED's on its face and a keypad. It was attached by a coiled cord to something that looked like an umbrella frame with a pistol grip."

"Sounds like some sort of communications gear," Beckwith said, nodding, "but why do you think I know anything about it?"

"My room is across the hall from yours."

"So?"

"This morning I heard you moving about before dawn. I figured to tell you about Manuel Vargas then, so I tiptoed across the hall to your room. I knocked twice before opening the door. You weren't there."

"Maybe I went down to the outhouse."

Espe shook her head. "I would have heard you on the stairs."

"So, if I wasn't in my room, where was I?"

"I think you were spying on the Sonorans."

"And if I was?"

"Then I want to help you."

Beckwith didn't answer for a full minute. Finally, he said, "Perhaps you *can* help. I would like to look over the Sonoran excavation. I need a way to slip out of the village without being seen. Have any ideas?"

She grinned and was once again a little girl. "I will come to your room after dinner and show you the way."

* * *

"Watch your head."

Espe's warning echoed hollowly from the walls of the small tunnel through which they crawled on their hands and knees. Beckwith glanced up at the sound, wondering how much further they would have to travel in this cramped style. Espe was a black silhouette framed in the dim light of the flash she carried.

The two of them had spent the day treating the people of the village. Night had begun to fall when they finished with their last patient and returned to the hacienda. At dinner General Trujillo had seemed distracted, as though his mind were on something more important than making conversation with his guests. Beckwith told another of his stories and swapped lies with some of the Sonoran officers before going upstairs to bed. An hour later, Espe had knocked softly on his door and the two of them had slipped down into Ynicente Galway's wine cellar. There Espe had shown him the entrance to an escape tunnel concealed behind one of the wine casks.

They had crawled some two hundred meters, and Beckwith was about to ask Espe how much farther it would be, when a round metal hatch appeared at the end of his restricted field of view. In another few seconds he found himself half crawling/half dragged out into the frigid night air. It was still an hour or so before midnight and a quarter moon hovered in the sky overhead, casting a soft silver glow across the landscape.

Beckwith glanced back at the tunnel entrance. The escape hole was well camouflaged. If it hadn't been standing agape, it would have been invisible. He

doubted that he could have spotted it in broad daylight, even had he known where to look. Espe did something to a section of the rock wall through which they had emerged and the camouflaged opening swung shut on well-oiled hinges.

"Which way?" he asked.

She pointed a direction and they started off, keeping to the cover of the arroyo into which they had emerged. Both were dressed head-to-toe in black, although not in darksuits. Since Espe had none such, the protection offered by Beckwith's darksuit would have been useless.

Espe led him across the desert and up a rise that Beckwith knew from previous visits was actually the rim of a broad depression in the midst of rolling hills. They carefully worked their way to the crest of the rise, moving the last hundred meters on their bellies. When they reached the top and were able to look into the bowl-shaped valley beyond, they found a large detachment of men working around a wooden derrick. The derrick covered a vertical shaft that had been sunk into the dry desert soil. The scene was lit by numerous lanterns strung between rough hewn poles. A steam engine puffed away beside a ramshackle building, emitting a column of black smoke into the moonlit sky. As they watched, a lift platform surfaced in the midst of the sturdy looking derrick and was immediately manhandled to solid ground.

"Recognize anyone?" Beckwith asked Espe, relying on her younger eyes to substitute for the binoculars which the Sonorans had confiscated.

Espe raised up on her elbows and squinted at the activity for a few moments. "There is Capitan Rodriguez talking to a soldier. And over there . . ." she gestured to the shaft. " . . . is a colonel of Inginieros who has been absent from dinner for the last three nights. The man he is talking to, the one with his back to us, is General Trujillo, I think."

"I want to get closer," Beckwith said. "You stay here."

He picked a tentative route that would take him close to the excavation. The floor of the small valley was covered with mesquite bushes and a few scrubby palo verde trees. Even without his amplifier hood he could see well enough by moonlight to spot the sentries posted around the rim. There seemed to be quite a few of them. They would make any approach difficult, but the ground cover was such that if he were careful, he should be able to get into position without being spotted.

"There is an old drainage ditch of the ancients a hundred meters from here, Doctor Darol. I will show you." Espe didn't wait for an answer, but moved forward with a catlike speed that Beckwith knew he would be hard put to match silently.

The drainage ditch was a concrete lined culvert that had been stained and broken by age until it was open to the sky. Beckwith studied the workmanship. There was no mistaking the product of the pre-Catastrophe machine culture.

"Why didn't anyone ever tell me about this, Espe?"

She looked at the jutting, broken concrete and shrugged. "You never asked, Doctor Darol. Father says that this ditch

paralleled an old railroad spur before someone ripped up the tracks."

"A railroad? Here? The maps don't show any railroad."

"Maybe father was mistaken."

"Where does this lead?" Beckwith asked, gesturing along the length of the ditch.

"Almost to the Sonoran diggings. We should be able to see everything from the other end. Just be sure to stay down."

This time Beckwith took the lead after debating whether he should send Espe back to the pueblo. He decided against it, primarily because he knew he couldn't find the tunnel exit again in the dark. A cautious half hour later, they were less than two hundred meters from the Sonoran shaft.

"Stay here," Beckwith said. "I'm going to get closer to see if I can hear anything."

"I'll come, too," Espe replied as she prepared to follow him.

"No, you won't!" he hissed as he grabbed her wrist. He swallowed, regained control, and continued in a softer voice. "Look, the chance of getting caught goes up with the square of the number of people blundering around out there. You stay here. If I'm spotted, you try to make your way back on your own. I've told you how to find my radio in the church. Get it and report what happened."

"I will, Doctor Darol," she whispered.

He slid out of the ditch on his belly and began the long crawl toward where a clump of Sonorans, including General Trujillo, were discussing something in voices too low to understand. He took his time, relying on years of experience to find every possible concealing shadow. When he had closed the range to less than a hundred meters, he rose up on his hands and knees and scurried across an open gap in the mesquite. The toe of his boot caught on a half buried, dry branch. The crack of its breaking was like the blast from a rifle. He froze as he hoped the excavation and steam engine noises would cover the sound. Then he saw a man's silhouette against the light of a distant lantern as a sentry moved cautiously through the brush to investigate. A flash beam moved in his direction. He got to his feet and set off in a broken country, stooped over run.

There were sudden shouts behind him and a bullet zipped past his ear with an angry wasp sound. Up on the depression rim, other flashlamps were coming alive. Two such were directly in front of him. He changed direction quickly, heading away from Espe's hiding place. He hazarded a backwards glance over his shoulder to see how close his pursuer was. As a result, he didn't see the dark shape rise from the brush and lunge for him. Two bodies collided with a bone-jarring thud, and Darol Beckwith slipped unwillingly into unconsciousness.

Beckwith opened his eyes and tried to focus them, but the small red-crested woodpecker inside his skull seemed determined to prevent it. He attempted to lift his head and gave it up as a bad job. His body was one giant ache. Even his teeth hurt.

At the thought of his teeth, he quickly tongued the false molar he'd so carefully fitted into place back in his room at the hacienda. His questing tongue found the

tiny container intact, for which he said a silent prayer. He reopened his eyes. A flesh-colored blur quickly filled his field of view and someone's smelly breath was hot on his face. After a few seconds' concentration, he managed to make out the features of General Trujillo.

"Welcome back to the living, *Médico*. Are you well?"

Beckwith heard his own voice respond in a croak. "My head is killing me. Where am I?"

"In our storehouse. Why were you spying on us?"

Beckwith took a deep breath and hoped the racking pain in his chest didn't signify a broken rib. "I wasn't spying. I was curious about whatever it is you are doing out here."

"You were spying."

"What's to spy on in this godforsaken wilderness?"

"Who sent you? The Californians?"

"I don't know what you're talking about," Beckwith said as he struggled to a sitting position.

"And I suppose you know nothing of the failure of our transmitter this afternoon."

"Nothing."

The general opened his mouth to reply, but closed it again when one of his troopers entered the storehouse and began conferring with him in hurried whispers.

Trujillo turned to leave. He spoke to Beckwith's guards as he swept out of the hut. "Bring in the girl and leave the lantern. We will give Doctor Beckwith a few hours to consider his fate. Perhaps he will be more forthcoming."

Moments later, a small figure sailed through the air and sprawled face down on the packed earthen floor. The Imperials left, and there was the rattle of a heavy beam being braced against the door. Beckwith crawled to where Espe lay, not heeding his own contusions. He gently turned her over as pangs of guilt stabbed at the conscience he had long thought armor plated against such feelings. Some Sonoran soldier's fists had left one eye nearly swollen shut and a dried trickle of blood emanated from a bruised and split lip.

Espe moaned and opened her eyes. "I'm sorry, Doctor Darol. They got me."

"So I see," he said, his voice gentle. "Anything feel broken?"

She shook her head, then sat up with considerably more ease than he had managed. The nascent tears that had welled briefly in her eyes were gone as quickly as they had come, and only concern showed on her face as she reached out to touch his cheek. "They beat you, too!"

He managed a lopsided grin. "Just clumsy. I tripped over my own feet."

She shivered. "I was almost away. One of them caught me in his light just as I left the drainage ditch. I tried to fight. I got in a good kick. I may have broken one man's kneecap."

"Good for you! That's one for our side."

"What are we going to do now?" Espe asked.

"I guess we wait," Beckwith said as he climbed unsteadily to his feet and wobbled to the door. He placed one eye to a crack and gazed past the broad back of the guard outside. From somewhere nearby came the *chuff-chuff-chuff* of the

steam engine and the acrid smell of mesquite smoke.

The scene outside was lighted by the same lanterns he'd observed previously. Rather than being spread out across the work site as they had been, however, the Sonoran soldiers were gathered in a small clump around the head of the shaft they had sunk into the floor of the desert. They grew excited as the lift car was hoisted out of the shaft via the rough-hewn derrick. Beckwith watched as General Trujillo and another man stepped onto the platform of timbers and then disappeared below ground.

"What do you see, Doctor Darol?" the girl asked.

He turned from the wall and hobbled back to where Espe sat cross-legged on the floor. He slid down beside her and quickly described the scene outside.

"What are they looking for?" Espe asked.

Beckwith hesitated, wrestled briefly with his conscience, then came to a decision. "Do you really want to know?"

Espe nodded, her expression grave.

"I think they've found an old nuclear fuel depository."

She frowned. "I don't understand."

"It's simple, really," Beckwith said with a humorless smile. "Our ancestors needed a place to dump the spent fuel from their nuclear reactors. They built a series of underground depositories for the purpose. For reasons of security, and also to keep the public outcry to a minimum, they kept the location of those depositories secret."

"And one of them was near Nuevo Tubac?"

Beckwith shrugged. "We don't know. Too many records were lost during The Catastrophe. There *was* a depository somewhere in the southwestern desert. This may well be it."

"Why would General Trujillo go to all of this trouble? Surely Moctezuma isn't attempting to repair one of the old Mexican reactors."

"I only wish he were, Espe. No, the Imperials are after spent reactor fuel because of the plutonium it contains. My bosses in San Francisco think Moctezuma is trying to build his own nuclear weapons."

Espe crossed herself and grimaced at the pain the gesture caused. "By the blessed Virgin, it can't be true!"

"That's the reason I came here, Espe, to see for myself whether it's true or not." Beckwith slipped a thumb and forefinger inside his belt and came up with a small cylindrical object. "Here, let me take care of your pain."

"What's that?"

"Field syringe," he replied as he stripped the cover from the short, sharp needle. "It contains a mild pain killer."

"I don't need it."

"You'll take it anyhow. I feel guilty about bringing you along, and it hurts me to watch you move. Give me your arm."

Perplexed, she offered him her bare arm. Beckwith searched for a spot that looked cleaner than the rest, then slipped the needle beneath the skin. Espe started at the sudden prick, but was otherwise stoic about the process. When the golden fluid had disappeared into the girl's bloodstream, Beckwith removed the syringe, snapped it in two, then tossed it into one corner of the shed. "Now, if they'll only leave us alone for a few hours . . ."

"What did you say?" Espe asked as she rubbed at the needle mark on her arm.

"Nothing," Beckwith replied. "Let's try to get some sleep."

It was nearly dawn before anyone bothered them. Beckwith sat with his back to the rough lumber of one wall, dozing fitfully with Espe cradled in his arms. He was awakened by the sound of heavy wooden beams being lifted from in front of the door. Espe stirred and the two of them climbed to their feet as Captain Villela ducked through the low doorway.

"The general wants to see you two!"

Two guards pushed their way past Villela, grabbed Beckwith and roughly thrust his wrists together behind him. Sharp pains shot up his arms as they tied his wrists together with rawhide cord. They didn't bother restraining Espe. One of the guards merely grabbed her hair and dragged her yelling out into the cold night air. Another sent Beckwith reeling after her with a blow from his rifle butt.

When they reached the derrick, Captain Villela gestured to the rickety structure suspended over the mouth of the shaft. "Onto the car, Doctor!"

"No need for the girl to come along."

"Sorry, I have my orders. The general wants both of you below. Get onto the car."

The platform shifted under Beckwith's weight as the doctor climbed aboard. The movement nearly caused him to lose his balance. He was followed by Espe Galway and the two guards. Villela remained on solid ground. A quick order from the captain sent the lift car on a jerky descent into the shaft.

The car dropped for nearly a minute while Beckwith and Espe studied the varied strata through which they were descending by lantern light. The rock walls finally fell away on all four sides, marking their entry into an underground chamber. The lift platform dropped another ten meters before it grounded.

Beckwith blinked as he took in the details of his surroundings. The chamber was long, hemispherical, and sloping. A single set of railroad tracks ran along its center. Uphill, lantern light reflected off a jumbled barrier of rocks that marked the location of an ancient cave-in; while downhill, the tunnel disappeared around a curve. One of the guards nudged Beckwith with his rifle butt. As he stepped down, the doctor fell to one knee amid the rubble that littered the tunnel floor from the spot overhead where the Sonorans had pierced the tunnel's concrete lining. Espe hurried to his side to help him to his feet.

The small party moved along the length of the railroad track. As they did so, they passed smaller side tunnels. Flickering lanterns betrayed the presence of Imperial work crews in several of these. They passed men in the main tunnel who appeared to be tracing cable runs. Finally, they came to a huge vault-like door with a man-size portal set in its face. The guards ushered them through the smaller opening and into the chamber beyond.

Beckwith found himself in an artificial cave roughly spherical in shape and some fifty meters in diameter. The cave's equator was girdled by a catwalk of steel meshwork on which they stood. The cavern was filled with massive machinery the likes of which Beckwith

had never seen before. At its center was an object he recognized after a moment's glance. And in that moment, Beckwith knew that the Mexicans had not found the old fuel depository. Whatever else this underground installation had been, it had never been used to store spent reactor fuel. However, that revelation brought no comfort. For directly in front of Darol Beckwith, suspended from the roof by an intricate system of cables, was a small winged spacecraft!

"Ah, *Médico,* glad you could join us!" General Trujillo's voice echoed through the underground chamber as he hailed them from within the delta winged craft's airlock. Trujillo stepped onto the meshwork bridge which connected ship to catwalk and clumped to where the prisoners were standing. He grinned toothily. "What do you think of my little toy?"

"Impressive," Beckwith replied. "What is it?"

"A single-stage-to-orbit, scramjet powered command craft," Trujillo replied. "Or so my experts tell me. But then, you already knew that, didn't you?"

"How could I have known?" Beckwith asked.

"Because your bosses, the Californians, told you what it was that we were after."

"I work for the Public Health Service, General. Our allegiance is to humanity, not to any sovereign state."

"Now why don't I believe you?" Trujillo asked. He turned to the guards who were gawking in awe at the ship. "Leave the girl. Go outside and close the entry. I have something confidential to discuss with the doctor."

*"Sí, mi General!"*

The two guards returned to the tunnel beyond and closed the man-size door behind them. "What I have to say is not for the ears of common troopers, *Médico,"* Trujillo said.

"Nor for those of a fifteen-year-old girl," Beckwith replied.

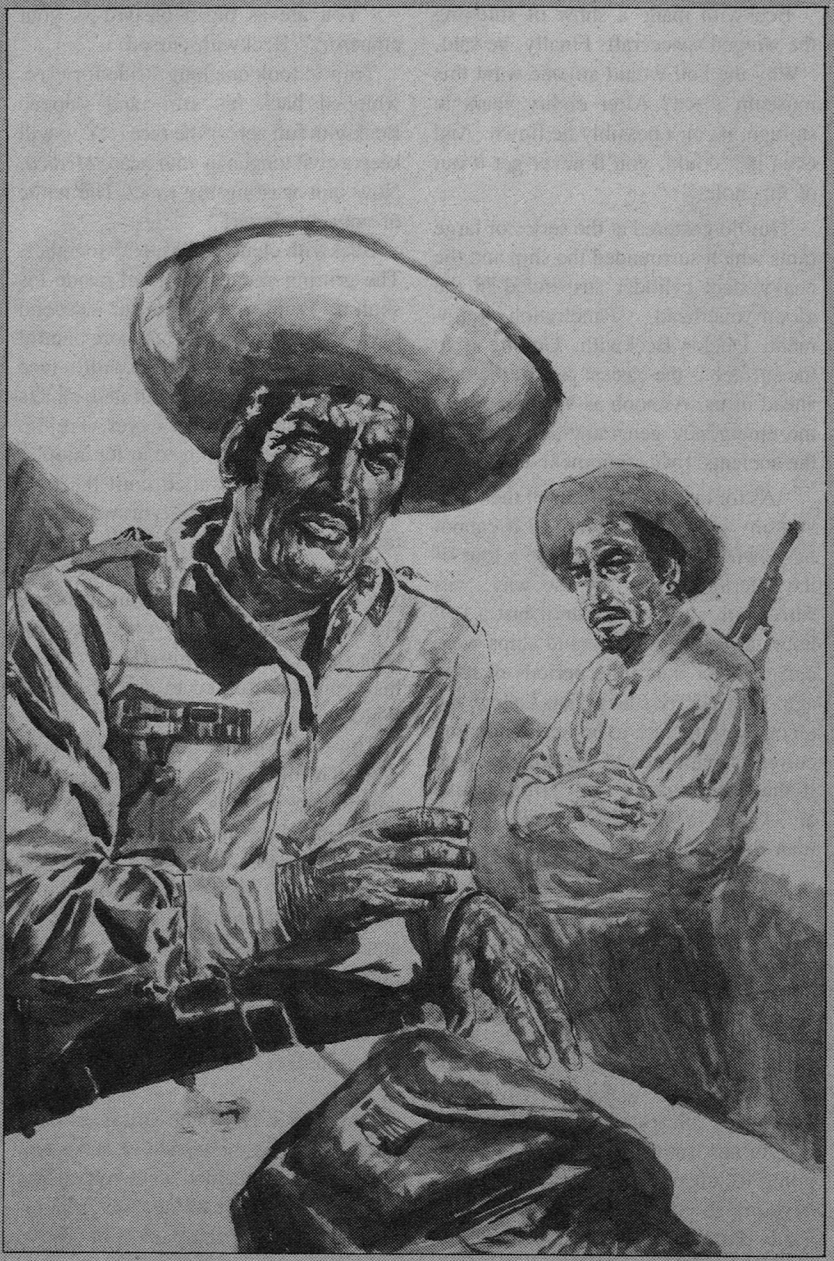
Trujillo moved to where Espe stood, took her chin in one hand, and tilted her face upwards to catch the light of the overhead lanterns. "If you refuse to name your employers, Doctor Beckwith, I will give Esperanza to my troopers for their pleasure. These are hard men. I doubt she will survive even a few hours of their . . . shall we say, attentions?" He relieased Espe, who shrank back in horror, stopping only when she came into contact with the safety railing at the edge of the catwalk. "Will you speak, or shall I call the guards back?"

"No one sent me."

Trujillo stared for a long moment at Beckwith, then threw his head back and laughed out loud. The sound of his laughter echoed eerily in the dimly lit cavern. "You almost convinced me that time, *Médico.* You had just the right mix of indignation and earnest fervor in your voice. But then, anyone the Californians would send would have to be a consummate actor."

Beckwith didn't answer.

Trujillo frowned. "Come now, *Médico.* I am truly interested in your opinion of our find. Is it worth your death and that of the girl to protect the traitors in Mexico City who told you of my mission?"



Beckwith made a show of studying the winged spacecraft. Finally, he said, "Why the hell would anyone want this museum piece? After eighty years in storage, it can't possibly be flown. And even if it could, you'll never get it out of this hole."

Trujillo gestured at the series of large rams which surrounded the ship and the heavy steel cylinder suspended in the gloom overhead. "Penetration equipment, Doctor Beckwith. Getting it to the surface is the easiest part of the task ahead of us. As soon as we trace down the emergency generators, we will let the ancients' own equipment do the job.

"As for the airworthiness of the craft, you are wrong when you say it cannot be flown. I have just finished a tour of the interior; which, by the way, was filled with an inert gas until just a few hours ago. These command ships were designed for indefinite periods of storage. His majesty's archivists believe the reconditioning task to be well within the current capabilities of the empire. And if they are wrong . . ." Trujillo gave an expansive shrug, "I won't be the man flying it."

"Even if you're right, what use is it? Where can you fly it to?"

The general smiled. The shadows on his face turned the expression ugly. "To *High Citadel,* of course. The orbital fortress is rumored to possess large stocks of nuclear weapons. If Mexico can obtain those stocks, we will put an end to the Californians's arrogance once and for all! But enough of this. Are you going to tell me your mission, or do I have my guards escort Esperanza down a side passage to begin the festivities?"

"You are as big a bastard as your emperor," Beckwith cursed.

Trujillo took one long stride forward, whipped back his arm, and slapped Beckwith full across the face. "You will keep a civil tongue in your head, *Médico.* Now quit wasting my time. The name of your employer!"

Beckwith clenched his teeth together. The gritting sound was loud inside his skull as Trujillo moved in for a second blow. The second slap was more painful than the first. Half of Beckwith's face was aflame as he concentrated on his tormentor through blurry eyes. Trujillo grinned evilly and moved in for another attack. Beckwith waited until the general was less than thirty centimeters distant, then spat full in his face. Trujillo staggered backwards, his features frozen in a look of shocked amazement. He slowly and carefully wiped the dripping saliva from his chin. As he did so, his expression turned to one of animal rage.

This time when he advanced on Beckwith, Trujillo's hands were balled into white knuckled fists. The general's first blow landed on the doctor's right temple, sending him backwards against the safety railing. The second smashed into his nose. The third doubled him over and drove the breath from his lungs. The pummeling continued for nearly a minute before Darol Beckwith slipped thankfully into the black comfort of unconsciousness.

Once again Beckwith struggled back from oblivion to a myriad of aches and pains. A fire seemed centered in his nose, and his breathing was accompanied by a recurring pain in his chest.

Of more immediate concern was the arm which he could not feel at all, and the low placed ache that signalled at least one sharp toed kick to the groin. A single cough welled up unbidden. He waited for the pain to subside before opening his single uninjured eye to survey his surroundings.

To his surprise, he found himself in his own room in the hacienda. Judging by the light streaming through the window, the time was early afternoon. Precisely *which* early afternoon was impossible to determine since the sky was the same pale blue it had been for the past several days. As he scanned his field of view, he noted a number of changes. Someone had gone to the expense of equipping the window with an iron grille. The pegs on which he had hung his clothes were bare and his valise was not in the corner where he had left it.

Beckwith carefully turned over in bed. The sudden torrent of pain that accompanied the movement left him with tears in his eyes. He let a sudden dizzy spell pass and gazed in the direction of the door leading out into the hall. He noted with interest that a ten centimeter square hole had been messily chopped in the oak door to form a peephole of the sort guards use to periodically check their prisoners.

At the thought that a guard might be nearby, Beckwith croaked out the single word, "Water!" He waited a few seconds and then repeated it in a voice that sounded like a nail being scraped across concrete. After a dozen seconds, a blond bearded face appeared at the peephole.

"Get me water," Beckwith cried out. The face disappeared and he lay back, panting from his exertions. Another minute passed before a rattling on the other side of the door, signaled the unlocking of a padlock. The door opened and Espe Galway entered the room. Her face still showed the marks of her beating, but she had washed and changed into clean clothes. She smiled when she saw him awake.

"Get me a drink!" he gasped.

"Right away, Doctor Darol," Espe replied. She moved to the rough table beside his bed and poured from the pitcher sitting there. She then cradled his head aloft and let him sip the cool liquid from a ceramic cup. After two painful swallows, he signaled that he was through. She lowered him gently to the pillow.

"Thank you," he said. "How long have I been out of it?"

"Two days. I was very worried. I thought the fat general had killed you!"

"To judge from the way I feel, he came close. What are my injuries?"

He listened quietly as she cataloged the damage which Trujillo had inflicted on him. He had already deduced that he'd suffered broken ribs from the fact that his chest was wrapped tightly in bandages, and every breath felt like a lungful of fire. The swollen eye was accompanied by facial lacerations; and the dizziness, coupled with the length of time he'd been unconscious, confirmed Espe's tenative diagnosis of a mild concussion.

He waited until she finished her list of his ills, then smiled painfully. "You have remembered your lessons well. What is your prognosis, Doctor Esperanza?"

"That you will live to face a Sonoran firing squad, Doctor Darol, as will I."

"Is that what they've decided to do with us?" he asked.

She nodded. "Those were the orders General Trujillo gave his men when he finally stopped kicking you. He told them to bring you here, and ordered me to care for you so that you would be awake and aware when the bullets tore into you."

"What about the ship? Have they raised it yet?"

Espe shook her head. "All work has stopped. General Trujillo gave orders that he must be present during the attempt. He was directing the salvage yesterday when he collapsed in the ship cavern. They have him in my parents' room."

"What is his condition?" Beckwith asked.

"His fever is very high. Forty-one degrees the last time I checked. He has developed convulsions and is raving. He has had numerous diarrhea attacks. I have tried to care for him, but he doesn't respond. Capitan Villela is very worried."

Beckwith grunted his understanding, then struggled to sit up. He tried to ignore the pain as he swung his feet over the side of the bed.

"What are you doing?" Espe asked.

"I'm going to see the patient," he replied through clenched teeth. "Now bring me my pants."

"But he tried to kill you, Doctor Darol, and will have both of us shot as soon as he regains consciousness."

"No one ever said the practice of medicine was easy. Now do as I say, girl!"

Beckwith dressed with Espe's help, then rose unsteadily to his feet. He hobbled out into the hallway with Espe supporting him under one arm. The dozen meters of hallway was the longest Beckwith had ever walked in his life. They were met at the door to the master bedroom by Captain Villela. From the bags under his eyes and the deep worry lines in his face, Beckwith knew that the Mexican officer hadn't slept in several days.

"Doctor Beckwith, you are awake!"

"No thanks to your chief. I understand that he is ill."

"*Sí*," Villela said, his head bobbing rapidly. "It is most mysterious. He was whole yesterday morning, but by afternoon had lapsed into a deep coma."

"What are the symptoms?"

"Before he lost consciousness he complained of a severe headache and pain in his chest. Do you have any thought as to what the problem could be?"

Beckwith started to shrug, remembered his ribs, and thought better of it. "From your description, Captain, it could be a number of things. I will have to examine him."

Villela snapped out a series of orders and Beckwith quickly found himself ushered into the sickroom. The expedition's priest stood at the edge of the bed and watched as the guards helped Beckwith into a chair at General Trujillo's bedside. He found a position which was less uncomfortable than any other, and quickly examined the ill man while letting Villela handle the manual labor involved. When he was finished, he asked, "Where is my luggage?"

"Your equipment cases are down in

the church where you left them. Your personal bag is in the study downstairs. General Trujillo was inspecting it before he fell ill.''

''Fetch the bag. I need to consult my library.''

Beckwith's leather case was brought to him. He noted that the false bottom was still sealed, and concluded that Trujillo's inspection had been a cursory one. He'd probably planned to return to it after organizing the salvage operation. Beckwith fished a small pre-Catastrophe computer from its carrying case. He opened it up to reveal a small, calculator size keyboard and an LCD screen. He carefully typed in an inquiry, then let his eyes scan the scrolling words. He did this a number of times before he looked up and nodded.

''What is it?'' Villela asked.

''I can't be completely sure, Captain, without tests I'm not equipped to make. However, I think your commander is suffering from septicemic plague. If that is the case, I'm afraid there is nothing I can do for him.''

*''Madre de Dios!''* the priest said from the foot of the bed as he crossed himself.

''But how can this be?''

''Who besides General Trujillo entered the spacecraft?'' Beckwith asked.

''No one, *Médico,''* Villela replied. ''The General's orders were quite strict on that point. He alone was to enter the ship. He didn't wish to risk one of the common soldiers damaging the equipment.''

''Then from the fact that he was the only one struck down, I can only conclude that he ran into an old war germ inside the ship. Both sides are known to have used mutated *Pasteurella pestis*, the plague bacteria, in their germ warfare laboratories. The war germs were bred for quick action and deadly effect.''

''Surely there must be something we can do,'' Villela replied.

''For the General, no,'' Beckwith said. ''Not if it's truly modified septicemic plague. We have ourselves to think about.''

''What do you mean?''

*''I mean the damned stuff is contagious, you idiot! Why else would they call it The Plague?''*

The priest crossed himself once more, while Villela merely gulped as his complexion lightened several shades. Finally, he said, ''What must we do, *Médico?''*

''The first thing is to seal up that devil's spawn in the cave where you found it. If the original source ever gets loose, it could decimate every town and village between San Francisco and Mexico City. The next thing is to call for help.''

''But we have no radio!'' the priest exclaimed. ''It failed several days ago and the technicians have been unable to fix it.''

''In that case, we must get you and your men to a Public Health Service station, *Padre*. The nearest is in Blythe, but you can't very well use that one, can you?''

''There is such a station in Hermosillo, Doctor,'' Villela said.

''So there is. You will have to go there, Captain.''

''But there isn't time. General Trujillo was struck down within twelve hours of first entering the ship. If we

too are infected, we will be dead before we reach the imperial border."

"I admit that I don't know how it hit him so quickly," Beckwith replied. "Perhaps he cut his finger while he was in the ship and the bacteria went directly into his bloodstream. You will have to pray that it doesn't attack you that quickly. But if any of your men have been infected, they have no more than a week to reach adequate medical care. Perhaps you can send a small party ahead with remounts and alert the doctors at Hermosillo Station. The Duke can loan them one of his aircraft to fly out to meet you on your line of march."

"What of the village, Doctor Darol?" Espe asked, terror in her voice.

"We'll have to do the same. We'll send riders as quickly as possible to Blythe. Perhaps they too can get an aircraft to bring serum here. In any event, as soon as General Trujillo dies, we'll burn his body and all of the bedding in this room. I'm sorry, Espe, but it's all we can do."

Darol Beckwith stood on the balcony of *Hacienda Galway* and gazed toward the south where a cloud of brown dust hung low on the horizon. It had been long minutes since even his electronic binoculars had been able to pick out the retreating Sonoran column. Even so, he continued to watch until the cloud of dust kicked up by their passage had begun to dissipate on a gentle easterly wind.

Despite their obvious fear of the plague, the Sonorans had retreated in good order. Captain Villela had waited for the moon to rise the previous evening before dispatching a group of his best riders toward Hermosillo. The main column had followed at dawn. Judging by the swiftness with which the men and horses disappeared from sight, Beckwith estimated that they would make at least sixty kilometers their first day.

He lowered his gaze to the remains of the Sonoran encampment just beyond the village wall. The two steam wagons were parked where he had first seen them. Like the rest of the heavy equipment, they had been judged too cumbersome to take along on the forced march and had been abandoned. The cavalrymen had been gone only a few minutes when the first villagers ventured forth to salvage what they could. Since then, practically the entire population of Nuevo Tubac had joined in the excitement. The abandoned equipment would go a long way toward repaying the people of the village for the occupation.

On a small rise beyond the abandoned encampment lay a mound of blackened wood and gray ash from which a thin wisp of oily smoke rose lazily into the air. The smoke marked all that remained of General Miguel Stefan Trujillo's funeral pyre. The Sonoran commander had stopped breathing at 04:16 that morning, and had been cremated shortly thereafter. The expedition priest had prayed for the soul of the departed even as soldiers doused the body and bedding with alcohol. Immediately following the funeral, Nuevo Tubac had been rocked by a series of distant thunderclaps from the excavation site. It had taken all of the expedition's remaining stocks of explosives to reseal the entrance to the underground base, but reseal it they had.

Beckwith was jolted from his reverie

by the sound of footsteps. He turned in time to see Espe Galway join him on the balcony. "Did you get through?"

She nodded. "They said to tell you that they were sending a team via aircraft, and that it will be here this afternoon."

"And the troops?"

"The first party of California dragoons will arrive in three days. The rest will follow a week later."

"Very good," he said, smiling. Espe had been in contact with Public Health Service Headquarters in San Francisco via Beckwith's hidden radio.

"Are they gone?" she asked, gesturing after the departed column.

Beckwith nodded.

"Good riddance! Now maybe you will explain all of this to me."

"Nothing to explain," he said. "General Trujillo ran into an old war germ, got sick, and died."

"I don't think so," Espe replied.

"Oh?" Beckwith responded, his single arched eyebrow asking far more than that simple monosyllable ever could.

"General Trujillo told us that the ship had been filled with inert gas until just a few hours before we arrived. Remember?"

Beckwith nodded.

"As you taught me, *Pasteurella pestis* is carried by the fleas on rats. I hardly think the rats, the fleas, *or* the bacteria could have survived eighty years in a ship without oxygen."

Beckwith shrugged. "How else could he have been infected?"

"I think your saliva was filled with *Pasteurella pestis* when you spat on him."

"Then I should be dead, too."

She shook her head. "Not if you've been vaccinated against the plague. That was what that injection you gave me in the equipment shed was for, wasn't it?"

"Are you saying that I, a medical man, would intentionally infect another human being with a deadly bacteria?"

Espe slowly nodded her head.

"Do you have any proof to back up such an allegation?"

She nodded again. "I checked your teeth while looking over your injuries. I thought the fat *generalissimo* might have loosened one with his blows. I found an artificial molar broken off at the root. That is where you kept the bacteria culture until you were ready to release it."

Beckwith sighed and put his arm around Espe's shoulder. "My ribs are beginning to ache. Why don't we go inside and we'll talk about this."

Espe assisted Beckwith to one of Ynicente Galway's softer chairs. Beckwith gestured for her to sit on the floor in front of him. She did so in a manner which made him envy the recuperative powers of the young. He reached into the pocket of his robe, fished out his pipe, and made a production of lighting it. Only when he was surrounded by a blue haze of tobacco smoke did he continue: "You seem to have some very definite ideas, Esperanza. Why don't you tell me what you think you know."

"I know your superiors sent you here to stop the Mexican Empire from establishing a plutonium mine. I imagine you were quite relieved when you realized that what they had found wasn't a nuclear fuel depository after all. Then you discovered General Trujillo planned to salvage the command ship in order to

raid *High Citadel*'s nuclear arsenal, and you killed him. Did I get that right?"

"Sorry, no," Beckwith replied. He watched his star pupil as her smile of triumph turned to a look of confusion. For a brief instant during the transformation, he caught sight of the beautiful young woman she would soon become. "The truth, Espe, is that there aren't any nuclear weapons aboard the battle station. *High Citadel* was a command-and-control facility, and as such, was prohibited from stocking nuclear devices. True, it commanded such weapons during The Catastrophe, but those were ground and space based systems long since expended.

"And while I'm clearing things up," he continued, "I'm afraid that I owe you an apology. That story about my coming here to stop the Sonorans from looting a nuclear depository wasn't the truth. Actually, the last of the fuel depositories was discovered and neutralized thirty years ago."

"But if there wasn't any fuel depository, and *High Citadel* doesn't stock nuclear weapons, *why did you kill General Trujillo?*"

Beckwith sighed. "That is difficult to explain. To begin, what caused The Catastrophe?"

Espe blinked at Beckwith's sudden change of subject. "The Sevastopol Incident, of course."

"Sorry, but you're wrong."

"That's what all the history books say!"

"Then they confuse the incident which touched off the conflagration with its root cause. It is true that the nuclear exchange was triggered by the sinking of two American destroyers off Sevastopol. The *reasons* the bombs began to fly were far more complex, and spring ultimately from a single source. The underlying *cause* of The Catastrophe was due to our ancestors tarrying too long in an era."

"What era?"

"That of unbridled offense, the period which began with the mating of nuclear warheads to intercontinental ballistic missiles and ended with the lofting of the first orbital defense systems. Nuclear-tipped ICBM's were weapons of irresistible power. They so overwhelmed all other military technology that for decades no defense was possible. That unpalatable truth drove our ancestors slightly insane.

"You see, Espe, once the option for self-protection is taken away, all that's left is for one side to threaten the other with extermination should they launch an attack. The analogy that was often used was that of two men standing in waist deep gasoline, each holding a match, and each ready to strike a spark at the first sign of his opponent's doing likewise. The only recourse to having one's own citizens incinerated was to incinerate the other side's citizens. Is it any wonder that they were a bit paranoid?"

"But what else could they do?" Espe asked.

"Nothing," Beckwith replied. "And that's the point. So long as there was no defense against nuclear tipped ICBM's, the strange logic of mutual destruction made sense. But that logic carried with it a terrible price. Throughout history, the race has become more unified as its level of technology has risen. Nothing mysterious about that,

of course. The effect is mostly a function of the ease of travel and long distance communications.

"The invention of nuclear weapons halted that process. In a world of such destructive power and half-hour flight times, a nation's first mistake could well have been its last. No one dared take the risk that always accompanies trusting one's enemies. So the world divided into two hostile camps and hunkered down to glare at each other across their respective battlements.

"To give credit where it's due, they *did* manage to control the stalemate for an admirably long time. Still, the situation was unstable. It couldn't endure forever. Sooner or later one of the men in the pool of gasoline had to strike a spark with his match. So long as warfare was all offense and no defense, disaster was inevitable."

"But warfare wasn't all offense, Doctor Darol! They had *High Citadel* and all of the other battle stations to defend them."

"True," Beckwith said, nodding. "But there is always a lag between the time a new technology is introduced and when societies come fully to grips with its consequences. At the time of The Catastrophe, the orbiting battle stations were still too new to have put to rest a century of paranoia. Had the nuclear exchange been delayed another thirty years, things would have been different. By that time the defenses would surely have been good enough to hold the damage to a level civilization could have tolerated. Who knows? Had the consequences of making a mistake not been so grave, the various leaders might have risked trusting one another enough that they could have avoided The Catastrophe altogether."

"What has all of this to do with you killing General Trujillo?" Espe asked.

"It has everything to do with it," Beckwith replied. "As you surmised, I killed the General to stop that ship from being raised. My service keeps its ears open. One of our operatives in Mexico City picked up rumors about a discovery in the royal archives, and of an archeological expedition that was being dispatched to check it out. I was sent here as soon as we received Manuel Vargas's report. My orders were to evaluate whatever it was that they had discovered, and to take any action I thought appropriate. That is precisely what I did."

"But why take any action at all? What could it have harmed if the Mexicans had raised that ship?"

"Do you remember what we spoke about at dinner that first night I came to Nuevo Tubac?"

"You said that nuclear weapons were too easy to build."

"And after that?"

"You explained how we've managed to surpass the ancients in some fields."

"That we have! Not many, I'll admit. But we have had our moments. The truth is that we are recovering much faster than anyone predicted. In many ways our current state of development is reminiscent of that of the Late Middle Ages in Europe. We too live in a world of postage stamp fiefdoms where rulers spend their time plotting the overthrow of their neighbors, or else scheming to prevent their own overthrow. As in the Middle Ages, this state of anarchy is a necessary precursor to the formation of

continent spanning nation-states. Also like the Middle Ages, we see definite signs of a renaissance emerging from the chaos of our present age. Out of this rebirth will come many things. There will be advances in the arts, in science, in mathematics. As our duchies and despotisms are consolidated, trade will increase and the grinding poverty in which we have lived these past eighty years will begin to lift. Roads will be rebuilt, oceans spanned, there will be a rebirth of intellectual vigor unmatched since before The Catastrophe.

"Unfortunately, that vigor will bring with it a much less welcome development. If there is one thing we can predict with full confidence, it's that humanity will soon attain the level of development necessary to produce nuclear weapons. And knowing human nature, we have no doubt that such weapons will be produced as soon as we regain the capacity. Once we reach that particular plateau, we will face the dilemma which nearly destroyed our ancestors.

"Whether we survive the Second Age of Nuclear Weapons will depend on two factors: How long can we delay the inevitable conflict, and how quickly can we rebuild our orbital defenses? When the time comes, we are going to need every bit of technology which *High Citadel* represents, as well as the information stored in the battle station's computers. If we allow that technology and information to be vandalized or squandered, we will delay by decades the time when the human race will be safely past the crisis. If, on the other hand, we conserve those assets for future generations, we may well shorten the epoch of overwhelming offense to a manageable period of time. Once through it, the race will reach an era of stability that could well ensure its immortality.

"Helping humanity survive the coming crisis is the true goal of the Public Health Service. We advance that goal any way we can. In this particular case, we advanced it by safeguarding *High Citadel*. In another place and time, we may choose to make certain that a king never produces a legitimate heir. In another, we may give an aged philosopher a new heart in order that he can live a few more years to complete his work. By so doing, we perform more good for humanity than with all the potions and nostrums ever peddled. That is the organization that I am offering you the chance to join, Espe. I await your decision."

There was a long silence while Espe digested all that Beckwith had told her. Finally, she asked, "Do you truly think that I would make a good doctor of the service?"

He laughed, unmindful of the pain it caused him. "If I didn't, I wouldn't have spent so much time training you. I must warn you, though. The work is difficult and dangerous, the food is poor, and you spend entirely too much time sleeping on the hard, cold ground. It will mean years of separation from your friends and family, and you could end up in a ravine somewhere with your throat slit or a bullet through your head. Still interested?"

"I have never wanted anything other than to be just like you, Doctor Darol."

He nodded. "In that case, we'll see about arranging passage to San Francisco for you when the plane comes this afternoon. I think you'll find it an interesting life. I know I have!" ■

# the reference library

## By Tom Easton

**A Mask for the General**, Lisa Goldstein, Bantam, $14.95, 208 pp.
**To Sail Beyond the Sunset**, Robert A. Heinlein, Ace/Putnam, $18.95, 416 pp.
**Time Pressure**, Spider Robinson, Ace, $16.95, 218 pp.
**David's Sling**, Marc Stiegler, Baen Books, $ ?, ? pp.
**Triplet**, Timothy Zahn, Baen Books, $3.50, 384 pp.
**Cobra Bargain**, Timothy Zahn, Baen Books, $ ?, ? pp.
**Glory Lane**, Alan Dean Foster, Ace, $3.50, 295 pp.
**Chess with a Dragon**, David Gerrold, Walker, $15.95, 207 pp.
**The Gate of the Cat**, Andre Norton, Ace, $16.95, 243 pp.
**Portraits of His Children**, George R. R. Martin, Dark Harvest (P.O. Box 941, Arlington Heights, IL 60006), $18.95, ? pp.
**Terry Carr's Best Science Fiction and Fantasy of the Year #16**, Terry Carr, ed., TOR, $17.95, 402 + xii pp.

Lisa Goldstein made quite a splash with her first books, which were antically, vigorously zany. Her latest, **A Mask for the General**, is much more quiet and thoughtful. It is also excellent in its way, but the vigor and zaniness are missing, and there are some failures in her realization of her vision.

She gives us the U.S. of the early twenty-first century, when the nation's economy has collapsed, thanks to a computer failure, and General Gleason has taken over. The General is as oppressive as any ruling general, and in his decade of rule the U.S. has taken a turn into the grey world of shortages, curfews, and pervasive controls now known only in Eastern Europe.

You may agree with me that Americans seem too generally ebullient to submit that easily. Goldstein argues that the ebullience belongs to a minority, with the majority being all too willing to keep their heads down and go along.

Despite the controls, despite censorship, despite the rehabilitation camps that await offenders, some people will continue to do things in their own way. Here, they are the maskmakers, all a little crazy, who create masks for those who join the "tribes." The tribes-people are those who refuse to go along with the General; they are jobless, rebellious, creative, crazy, and their masks are devices not of concealment but of revelation.

In this context, Goldstein gives us Mary, a teenaged, epileptic runaway from convention, seeking a mask. On her arrival in Berkeley, Mary meets Layla, maskmaker, begins a warmly perplexed friendship, and becomes her apprentice. But her training will involve confronting and accepting her epilepsy, her inner self. She rebels. Layla designs a mask for the General and takes it to the local police station after curfew to start it on its way to Washington. Mary, full of conflict over her relationship to Layla and to herself, follows, and both wind up in a rehab camp. Later they escape, and Mary begins to move toward open, violent rebellion, while, indeed, the General's mask, step by coincidental step, moves nearer to its target.

Goldstein's theme is the face we present to the world. She tells us that we wear masks, willy-nilly, and that artifactual masks can be more honest portrayals of our true selves than the fleshly guises we don to satisfy lovers, bosses, and strangers. And then she adds that if we can just find and wear a true mask, we will find our souls. We will be at peace with ourselves, and we will no longer have to rape our fellows and our world.

Goldstein speaks in symbols, of course. Her book is a lengthy parable, and a most marvelously structured one. But that book does pretend to be a novel, and it asks to be judged as one. And this is where we see the failure: Goldstein's characters are mostly poses, wire frameworks on which she can hang the social and psychological roles she is discussing. They move, all herky-jerky, through the figures she has set for them, and neither they nor she convince the reader. Goldstein has fallen victim to the trap inherent in message fiction: when a novelist makes the message too prominent, or warps the story to serve the message, the story suffers.

If she objects that, dammit, *Mask* is a parable, after all, and parables need not live up to the same literary standards as more unabashed novels, then I reply that that only holds for parables that do not bill themselves as novels. I do *not* object to message fiction—sometimes I feel that I too often use the existence of a message or theme in a story as a touchstone for quality—but the message should be core, skeleton, underlying premise, not the obvious surface.

I had been looking forward to Heinlein's latest, **To Sail Beyond the Sunset**, as eagerly as anyone. And at last, it arrived. I finished what I was reading, opened the covers, and found Maureen Johnson, mother to Lazarus Long, in bed with a corpse and a cat, alone on a strange world, and about to be jailed in anticipation of a death sentence.

Great stuff, you say? So did I, until Chapter 2 dropped me back to Maureen's childhood to show her total history, precociously maturing under a liberal-minded father, developing unquenchable hot pants, marrying, bedding, birthing, bedding, birthing, bedding, bedding . . .

For all Maureen's charm, the story quickly became a bore. We have seen too much of it before, and besides, the

heroine is much too clearly Heinlein's —perhaps any man's—vision of Ideal Womanhood, beautiful, sexy, and ever-ready. Heinlein adds intelligence, but he fails to recognize that a woman cannot conceal her cerebral talents as easily as Maureen, and remain both smart and sane.

To my mind, Heinlein is right that intelligence is an essential part of the feminine ideal. But I suspect he here finds that intelligence valuable mostly because it affords him a lovely opportunity to tell us where the world went wrong on its way to the Crazy Years and to knit the strands of his several universes ever more tightly together.

There is also the puzzle with which the book begins. From time to time, Heinlein condescends to update us on Maureen's current plight, but we don't really leave the biographical exercise until three hundred and fifty pages later, after Maureen has helped D. D. Harriman win the moon. Then, at long last she is rescued, and soon thereafter the Long family sees its way clear to clarifying a mystery that has plagued Maureen ever since her father went off to World War II. And yes, Pixel the Cat Who Walks Through Walls is here, too. In fact, since he is crucial to Maureen's salvation, he plays a larger role here than in the book named for him.

This one will please most those who dote on the Heinlein canon. Those who don't really care how many men Maureen bedded will not be satisfied by the book's novelette-worth of science fiction.

There is more than a trace of Heinlein's influence in Spider Robinson's latest work, **Time Pressure**. That influence may be especially noticeable because I just read the Master's *Sunset*. In a pre/sequel to *Mindkiller*, Spider gives us the Nova Scotia hippies among whose like we may believe he lived until recently (when he moved to Vancouver). They are people of remarkable zaniness, painted with remarkable love, and they face a remarkable situation: Protagonist Sam finds a time-traveling nude in his woods, come back in time to study our days. Being an SF reader, he prides himself on his readiness to accept the strange, and he does fairly well, enlisting first a hippie friend, Snaker, who actually writes SF, and then their mutual spaced-out friends. But he has blind spots, centered on his inability to love, and he is astounded when Rachel, his visitant, finds non-SF readers even more accepting than he and Snaker. And then he finds the clues that hint that Rachel's mission is far more sinister than anthropology.

Can he read the clues aright? As Spider misdirectingly says, "Not in this life." Sam must almost literally be reborn in order to save his world, and then he cannot save it in any way that he might have expected. His blind spots give him a severe handicap.

The Heinlein influence shows in explicit homage, as when Rachel calls Sam's world and hers separate "fictions." It is stronger in Rachel herself, for she is a stranger in a strange land, and she has the rare gift of blessing her friends with sex. That is, this rose by any other name might well be Heinlein's own Maureen.

Is Spider a hippie Heinlein? He is an excellent writer, evoking laughs and tears at will, telling marvelous stories and sprinkling in puns so aptly chosen that missing them detracts not at all from your reading pleasure. But he has not yet forecast an age of the world as Heinlein foresaw—and shaped—the sixties (*Stranger in a Strange Land* came out in 1961). So far, Spider echoes an age,

those same sixties, but then Heinlein echoed the forties until he came up with *Stranger*, and Spider may yet do as well. He has the time, and he seems to be working toward some description of the kind of intelligent (as opposed to mindless gut) joy and sharing that really could save the world. Spider has a very non-hippyish, and Heinleinian, respect for rationality.

Spider's respect for rationality surely puts him, like his protagonist Sam, on the fringes of all human groups, whether hippies or yuppies. Certainly, it makes him that rare bird, a human being who has a working, sensitive bullshit detector. I urge you to read him, and Heinlein, and a very few others, with an eye to how you may improve the effectiveness of your own bullshit detector.

Baen Books' Betsy Mitchell, late of these hallowed pages, took me very seriously when I said I was willing to review manuscripts, without waiting for galleys, in the interests of getting the reviews out where readers can see them *and* hope to find the books. How seriously? Well, the stack of rubber-banded paper is now three feet tall, and it's growing. I will *have* to ignore some of it if I am to cover any other publisher's wares.

The stack was last topped by Marc Stiegler's **David's Sling**, the tale of an information-intensive weapons system that destroys not the enemy's landscape or populace, but its battlefield leadership. This system is comprised of robot rovers that detect those units—tanks, ships, or men—that issue orders, and then blast them. It also has orbiting platforms that send steel spears, not bombs or beams, plunging to destroy their targets. It is selective, pinpoint, intelligent warfare, and it is precisely as gimmicky as you might expect: great stuff for *Analog* readers.

It's even more *Analog*ian because the Sling weaponry emerges from the Zetetic Institute, a corporation dedicated to using and promoting rationality in an irrational world. It is the first Information Age institution, and it must fight for its survival, for its style of operation is violently opposed by the bureaucrats, unions, industries, and media of the fading Industrial Age.

Do I make it sound as if Stiegler's story has little but its ideas to recommend it? Then I am getting my point across. There are characters galore, but most are mere figurines imposed on the story to illustrate or act out some role in the rationality vs. irrationality debate. They lack only the names—X. Grinder, Ty Coon, M. Pire Bilder, and so on—to make them fit that ancient mode known as the morality play.

Even the action supports the moral: A weak president bargains away America's strength while the Zetetic Institute is developing the Sling system. A Pentagon incompetent wheels and deals to get the system under his wing so he can properly "militarize" it, which will keep it from working. But then the USSR attacks Europe. America has no defense except its vast productivity, but to use that productivity, the Institute must rush the final stages of Sling design in a lovely display of Stiegler's understanding of how computers really work (or don't). The Sling succeeds, of course, and the book ends with some lovely slam-bang action that leaves the world safe, not for democracy, but for humanity.

Like Goldstein, Stiegler is here guilty of blatant message fiction. He is in fact even more blatant than she, with much less subtlety, and his work much better deserves the name of pamphleteering.

Where Goldstein was philosophizing, Stiegler is lecturing; he has written a political tract.

So why should we read his book? Ahh! We agree with him, don't we? He's preaching to the converted, who believe in the power of rationality even when we fail to be as rational as good Zetetics should always be. We can appreciate the fervor and the logic of his sermon. Unfortunately, that very fervor will make him seem a little shrill to the unconverted, and with his book so obviously a tract, they will resist the logic of the message. In fact, those who need the message most will surely never see it. They don't read SF, after all.

Every SF writer seems to feel some obligation, at some point in his or her career, to rationalize fantasy and fit it into the SF mold. Tim Zahn makes his bid with **Triplet**, an action adventure set on three very different worlds. The first, Threshhold, shares our universe. It is blasted with the craters of an ancient nuclear war, which are most concentrated precisely where they seem to have done the least actual damage: around a Tunnel leading to a second world, Shamsheer, in a second universe where humans also dwell and the technology is far beyond our own. And Shamsheer, of course, has its own Tunnel, leading to Karyx, where people use magic to make sprites and demons do all their work.

To this venue of great and marvelous potential flees poor little rich girl Danae mal ce Taeger, trying to get away from Daddy Dear's greasing of every path before her. She wants, dammit, to accomplish something on her own, even if that means she must flee to another universe to do it. And she does, aided by professional guide Ravagin. Together they find signs that the demons behind Karyx are plotting to erupt into Shamsheer, and then perhaps to Threshhold, prompting the reader to wonder whether all those craters indicate a previous attempt. Confronting plots, paranoids, and demon-possessed robots, they must scotch the rebellion, and if Ravagin carries most of the burden of the action, well, really, what is a poor little rich girl able to do, anyway? She really does need the bodyguard Daddy Dear has assigned her, and her role doesn't really open up until she accepts that her wealth and position are assets as valuable in a fight as magic spells or weaponry.

Do you get the idea that I think *Triplet* is hackneyed, clichéd, and unexciting, and the characters are trite? You're right. What's worse, demons were pretty stale meat before Zahn tackled them, and he didn't really freshen them up much.

Zahn does a much better job with **Cobra Bargain**, the latest entry in his multivolume saga of the Moreau family. Jonny Moreau, with whom the saga began, is gone. His sons in their turn are aging; one, Justin, is a super-powered Cobra warrior himself; another, Corwin, is a bureaucrat faced with political nasties and signs that the world of Qasama, whose insidious threat the Cobras had presumably neutralized thirty years before (see *Cobra Strike*), is again a danger. Now Jonny's granddaughter and Justin's daughter, Jasmine, decides she wants to be a Cobra too. Never mind that the Cobras are now and have always been all male. She is determined to carry on the family tradition, and to open up the Cobras for her gender.

She makes it. Politics conspire to make her essential to the new mission to Qasama, where something is blocking the spy satellites' views of a partic-

ular installation. She and her teammates are to investigate, but as their shuttle plunges toward the Qasaman forest, it is blown to bits. Jasmine is the only survivor, and she manages to blend into the local scene and learn that the secret installation is called Mangus, meaning Mongoose, a word ominous to Cobras. Then she must infiltrate Mangus, learn its secrets, and either disable it or get word home, lacking both a shuttle and a radio (the Cobras' built-in equipment has its limitations, after all).

Jasmine Moreau is no Danae mal ce Taeger. She leans on no man, by choice or accident, once she has tapped her kin to pressure the establishment enough to get her into the Cobras. She is smart, empathetic, energetic, determined, an able warrior and as able a diplomat, and when she is done a number of males have had their consciousness suitably broadened or their egos ventilated. And Qasama is no longer the hazard it once was. She is so much more satisfying a heroine that *Cobra Bargain* might have been written by a very different Zahn than *Triplet*.

On the other hand, perhaps Zahn is exploring the various ways in which women of different backgrounds and personalities can respond to the demands of adventure. If so, he is doing very interesting work, and *Triplet* gains value.

Do you like throwaway books that leave you with a smile? Then you'll love Alan Dean Foster's **Glory Lane**. The punk, the nerd, and the airhead blonde who thinks the most important thing in the universe is shopping, of all things, meet an alien at a bowling alley. The alien's bowling ball takes some weird hops, but that fun doesn't last long. The alien is being pursued by Scourge-of-the-Universe thugs who want the ball, whose name is Izmir, and the teenaged heroes help him escape.

And off they go, whizzing away to the humongous city of Alvin, learning that Izmir is wanted by every sapient species in existence, including at least two that no one has ever heard of, getting shot at and captured, escaping, getting captured again, and finally talking Izmir into saving everyone's bacon. Meanwhile, we learn that the airhead blonde isn't so airy after all, and that, yes, shopping *is* . . .

*Glory Lane* is almost the literary equivalent of Grossville High bubblegum stickers, but that's all right. Foster obviously had fun writing it, I had fun reading it, and you will too.

David Gerrold's **Chess with a Dragon** is billed as a book for young readers, and that is what it is, if you equate young readers with simpleminded illustrations, lots of BEMs, and not too much story. But Gerrold also talks of bheer and alcoholh, and that makes me think he meant the book for fans, not kids.

The tale itself relates what happens when humanity encounters galactic civilization, centered on the institution known as the Interchange. The Interchange is a data repository, a vast library which any species can tap. Naturally, humanity taps it liberally, and when the BEMs say, "Uh, hey guys, there's this question of the bill, you know?" they must find some way to keep the entire species from being eaten, or used as incubators for larvae, or . . . Humanity's envoys manage in a nicely, justly sneaky way.

Fans of Andre Norton will be delighted to hear that she has brought out another Witch World novel. It's **The Gate of the Cat**, and they will find it delightful. It has everything her fans

expect—a young heroine, a telepathic cat, and potent evil that somehow cannot stand against the pure of heart.

But to this jaded reader, *Gate* is barely worth the time and trouble to read it. It has been a few years since Norton last showed the inventiveness that made the first Witch World stories so marvelous. She has let her World degenerate to cliché, and this one doesn't save the situation. It's little better than more of the same, as Kelsie McBlair stops a Scots poacher from killing a wildcat and tumbles through a gate of standing stones into Escore. There she fends off an attack of the Dark, the cat is given a jewel of power by a dying witch out of Estcarp, Kelsie learns that the witch and a companion had been on a quest for a power source that might revitalize the forces of Light, and she finds herself saddled with a *geas*. She must continue with the quest, willy-nilly, and at the same time decide in which world she most truly belongs. Not surprisingly, mysterious forces conspire to lead Kelsie to the Witch World's seat of power, and in the tumultuous finale the Dark is laid to rest, more or less for good.

Perhaps Norton intends this one to end the series and let her get on to something else. I hope so.

Dark Harvest is a small Illinois publisher that has done a few notable fantasy books. Now it brings us a collection of George R. R. Martin's stories, **Portraits of His Children**, with a very laudatory introduction by Roger Zelazny and illustrations by Val Lakey Lindahn and Ron Lindahn. If you like Martin's tales, buy the book. If you're a collector, you may prefer the $39.95, 450-copy limited edition, but that is surely gone by now.

What is here? From *Analog* there are "With Morning Comes Mistfall" and "The Second Kind of Loneliness." From *Asimov's* there are "Closing Time," "The Glass Flower," and the excellent title story. And from elsewhere there are "Unsound Variations," one of my favorites; "Under Siege"; "In the Lost Lands"; "The Ice Dragon"; "The Lonely Songs of Laren Dorr"; and "The Last Super Bowl." You cannot lose with this one, though you may choose to wait for the inevitable paperback.

The late Terry Carr's **Best Science Fiction and Fantasy of the Year #16** is now available, and it is, as expected, interesting to compare it to the other Bests. For one thing, it overlaps not at all with the Wollheim volume (though it does list a Wollheim pick or two as "Recommended Reading"), while matching the Dozois five times, with Orson Scott Card's "Hatrack River," Judith Moffett's "Surviving," James Patrick Kelly's "The Prisoner of Chillion," Harry Turtledove's "And So to Bed" (from this magazine), and Richard Kearns's "Grave Angels." Of the remaining six stories, half are in Dozois's list of "Honorable Mentions": Kim Stanley Robinson's superlatively wry "Escape from Kathmandu," Carter Scholz's "Galileo Complains" (I did, too), and Lucius Shepard's emotionally and temporally tangled "Aymara." What's left? Try Silverberg's "Blindsight," as deft as ever. Try John Varley's warm and pity-evoking "Tango Charlie and Foxtrot Romeo." Or Ian Watson's "Cold Light," in which an Anglically daft clergyman develops a halo, which proves, in truth, to be . . . And then there's *Locus* editor Charles N. Brown's "Year in Review" essay, a fine recap on many counts.

What about the Dozois debate? Is he a biased, self-promoting son-of-a-gun,

or is he a crackerjack editor whose magazine choices neither he nor anyone else can resist? Count 'em, folks: five out of eleven are from *Isaac Asimov's Science Fiction Magazine*. That's a higher percentage than Dozois himself chose, and the highest percentage yet. And three of Carr's five, Dozois had only in his "Honorable Mentions" list![1] The facts speak for themselves. ■

1. No, Carr didn't put many of Dozois's picks on his "Recommended Reading" list, but then his list is a lot shorter.

## ON GAMING

*continued from page 79)*

beam down to explore an alien planet à la Kirk and crew, call up tri-corder readings, and decide where on the planet you wanted to go—and then see it on the screen. Or perhaps a murder mystery game where you pick the clues to follow, and the characters talk directly to you, giving you leads or leading you astray.

It could be exciting stuff.

The equipment is all there to create an interactive game. The control unit, just a bit larger than a cable channel selector, uses a high-speed microcomputer and has circuits for controlling your VCR through an infrared remote control. It has a powerful 256K bytes of RAM. Besides being able to store information about your tapes (timing, titles, and graphics), the processor can access the sequences on the videotape in any order.

Unfortunately, Videonics's DirectED is being strictly promoted as a home video editor, a way of creating watchable home video movies—The Best of Junior's Birthday.

But the manual also quite openly mentions future "modules and applications." One of these applications, CollectED, is already planned. They call it "the video jukebox," a system for keeping track of all your music videos.

Which, in my case, is none.

But the company is also aware of the interactive potential of the device. Establishing a base as a home editor/graphics maker, they say, gets it out into the marketplace and into people's homes.

The second step I hope to see them take is commissioning some clever designers, like the folks from Eon, to create some exciting interactive videotape game that will turn the DirectED into a revolutionary game machine. ■

# brass tacks

Dear Mr. Schmidt,

Your editorial on "brain language" brought to mind an incident which happened in my youth. I believe I was about twelve years old. An acquaintance of my mother's, with her young son (I think between one and two years old), was visiting. The child was attempting to communicate with his mother, who seemed to be ignoring him. As he became more strident in his efforts, his mother said to my mother something like "he talks all the time, but I can't understand anything he says." My mother couldn't understand him either. This surprised me because I understood the child perfectly. So I interpreted for them; I believe the boy needed to use the bathroom.

After that was taken care of, the mother had me act as an interpreter as she and the little boy carried on a conversation. I suddenly realized that adults lost the ability to understand the "infant language" that the child was using, and that I hadn't yet lost the ability. I was even more surprised to learn that another boy, three years younger than I, also could not understand the child.

This incident impressed me so much that I resolved never to lose the ability to communicate with infants; I thought that I could accomplish this by keeping in practice, talking with infants frequently. Of course, I broke this resolution almost immediately.

Interesting, the child in this incident understood his mother, and my mother, and me very well; and the language he was using was basically English. His pronunciation was very strange, and I believe the grammar was also very different.

Your editorial brought this memory to my attention for the first time in possibly forty or fifty years.

ARTHUR E. SHERBURNE
Hollis, NH

Dear Mr. Schmidt,

I'm afraid I have nothing profound or controversial to say. I have just been moved to tell you how much I have appreciated *Analog* during your time as editor. You have brought a lighthearted, humane, and thoughtful tone to the magazine. As a result of my obvious enjoyment each month, my wife started reading a story or two while I was at work. Now she has come out of the closet, so to speak, and we enjoy each issue together.

I started reading *Analog* in the last few issues under John Campbell. While I respected Ben Bova's many talents as a writer of science fiction, under his term the magazine took on a distinctly sexual tone that made me uncomfortable. Not so much that I stopped buying and reading *Analog* avidly, but enough so that I frequently stopped and wondered why a particular scene was included in the story if not for gratuitous sex.

I have especially enjoyed your comments and editorial about various aspects of teaching. I taught for ten years in the U.S. before taking a job as a headmaster at a private school here in South Africa. Without going into details, let me just say that there is nothing to make you appreciate your own system more than to live and work in someone else's. My experience here leads me to believe that many of South Africa's problems are firmly rooted in the attitude South Africans hold toward the education of their children.

Perhaps it is our common background in teaching that makes me comfortable with your approach. Sometimes you make me mad, and sometimes you make me laugh—but you always make me think about old things in new ways, and that's why I love *Analog*.

REV. JAMES P. COOPER
Rep. of South Africa

Dear Dr. Schmidt

I enjoyed H. Keith Henson's article on memetics and thought your editorial brought up some important points. However, there is one point I would have liked to have seen addressed that you both overlooked. Memes are ideas, and ideas, unlike viruses, are true or false. How can truth value be understood in relation to memetics?

There are several different philosophical theories about what constitutes a true statement (a statement in this sense is the expression of an idea). I hold to the correspondence theory, which maintains that the world is objective—the world is what it is whatever we may believe about it—and that a statement is true to the extent that it accurately describes the world as it is.

Memetics, as I understand it from the article, would primarily be interested in an idea's survivability; how and how long and where it can propagate. I would hope that survivability would be related to truth; that true ideas have a survival edge over untrue ideas. But it is clear that survivability is not equivalent to truth. Astrology and Nazism are examples of ideas (or groups of ideas, actually) that continue to survive despite their complete independence from the real world. On the other hand, democracy, which is based on what I believe are true ideas, appeared in ancient Greece and died out again.

I am less optimistic than Mr. Henson on the possibility of memetics being put on a scientific footing on a par with the germ theory; I can't see how you could isolate a meme in a lab, for instance. But even if memetics became a full sci-

ence, I don't believe it would, as he said "defuse the emotional connections and substitute something closer to dispassionate understanding of the parasitic-to-symbiotic memes behind [religions or communism]." Memetics could describe the relationships between memes and their host cultures on both sides of a given religious or political question, but it would still remain to be decided which side was right.

DAVID KING

Grand View, NY

*The author replies . . .*

The truth of a meme can be quite unrelated to its ability to survive in a culture. (Examples abound.) There is a meta-meme (that is a meme which is used to select memes) by which we can test the truth or falsity of some memes. It is called the scientific method.

Mathematical analysis makes it obvious that democracy (in the form of many voting on decisions) will almost always make "right" decisions when even a slight preponderance of those voting make the "right" decision. Unfortunately, the same reasoning shows that once a slight majority prefers the "wrong" decision the group will make "wrong" decisions almost all the time. Worse yet, a short term "right" will often be a long term "wrong." It could be that democracy is a conditionally true idea where the necessary conditions for its being true are a highly educated and concerned electorate.

H. KEITH HENSON

---

Dear Dr. Schmidt,

This is the fourth letter I have written to you concerning the article on "Memetics and the Modular Mind" and your editorial in the August 1987 *Analog;* five if you count a massive revision of one of the others. This is the only one mailed. I have a gut feeling which doesn't come out right on paper, a hell of a situation for a writer.

First, I feel that H. Keith Henson is trying to attribute to memes the qualities of both viruses and genes. This might be merely semantics, as a virus has its own genetic code. However, our genes are not merely complex viruses. This should mean that, as a strict analogy, there should be meme viruses and meme brain cells (however labeled).

One aspect of similarity not mentioned is that as one ages, one becomes a reservoir of antibodies to bacteria and viruses until degeneration proceeds to the point of weakening defenses. One's resistance to propaganda seems to follow a similar pattern, getting stronger as one grows older unless the mind deteriorates.

Almost as an aside, religious and other tolerance did not start with the Renaissance. Theodoric the Ostragoth, Emperor of Rome circa 500 A.D., was an early Christian advocate of total religious tolerance, and had other quite modern ideas. I often wonder whether he has been largely ignored by history because he was at least a nominal Arian. (Arianism is still regarded by the Catholic Church as a greater heresy than Protestantism.) The "Dark Ages" had spots of light.

The meme theory is just that at present, but the speed of science today means one must put forth cautions early. It might be necessary to recast your editorial from time to time, as scientists love to develop obscure terminology, and by the time your editorial is needed, memes might be called "zilches," or something else. Don't leave it to historians to discover your editorial when it is needed.

Mr. Henson seems to say that old line religions are antibodies to infection of or by memes. He may have a point

there, as they certainly slow down the attack of new ideas. (This is both compliment and criticism.) Inertia can be good or bad.

Thank you for bringing this to a wider audience. The more minds working on a problem, the better.

GEORGE F. KIESEL
General Delivery
Marshall, WI 53559

P.S. I enjoyed "Candle in a Cosmic Wind" by Joseph Manzione, as I knew the Stateline Hotel well. I wonder if he knows that the place made its own electricity with a diesel power plant for years, and perhaps still does.

---

Dear Dr. Schmidt,

The recent editorials *Analog* has published about the current predicament of the American space program and ways that it might be put right again are well taken, but I think you may be skirting some of the central issues.

It is indisputable that if the space program is to be saved from imminent collapse and dissolution, someone is going to have to get behind it politically. And it does appear that science fiction readers represent the hard core of support for space exploration. However, as long as we continue to fight over the petty details of what needs to be done, instead of doing something, our cause is probably hopeless. We could still be arguing about the relative merits of a manned expedition to Mars long after the last space shuttle explodes and falls into the sea.

Up to this point, there have been several attempts to organize a pro-space political movement. Several groups have come into existence over the past fifteen years, L-5/NSS and the Planetary Society being prime examples, but their memberships are small and their activity levels very low. While I can think of many reasons for this (including the dreadful possibility that no one is really interested), I think the most likely explanation is that we're simply not the sort of people who march in the streets and throw rocks at politicians. We have our spokesmen and lobbyists, of course, but they seem to be a pretty useless lot. Despite money and time, the Planetary Society's effort to keep Mars Observer on track failed.

What can we do, then?

We know we're not going to march in the streets. Ten assorted teenagers and pudgy middle-aged folk picketing the White House would look just hilarious on the evening news. And we know our lobbyists are not succeeding. Carl Sagan may be prettier than Roald Sagdeev, but anyone ridiculed by Johnny Carson isn't going to succeed. Billions and billions of people are still chuckling at him.

What we *can* do is conduct a twenty-first century-style political action campaign. It hasn't been done before and so may succeed through virtue of surprise.

No one knows how many Americans really support space exploration as a general idea. Lots of people appear to think that it's wrong and/or evil—but science fiction/fantasy movies are extremely popular. *Superman IV* was a silly, lightweight movie, but it contained a heavy pro-space "message." The only space-faring people in it were Russians, and the only sign of America in space was an abandoned flag on the Moon. Guesses as to the number of people who would actually buy into the idea of a large space program range from a few hundred thousand (the readership of SF magazines and the like) to a few million (the people who went to see *Star Wars* twenty times, for example). If that number is even as large as 100,000, then

the pro-space community, disorganized as it is, may be in position to make a strategic strike on the American political process at its most vulnerable point and quite possibly change the course of history.

If 100,000 people sent 100 letters every month between now and November 1988 to a major public official or political figure in Washington, the mail distribution system in the nation's capitol would collapse under the flow of mail. What do you suppose this nation's political leadership would think if, between now and election day, they received 140,000,000 letters on the same subject?

How hard do you suppose it would be for the average *Analog* reader to send out 100 letters a month? The process is simple enough:

1. Compose a letter.
2. Get 100 copies run off at the local copy center (about $5).
3. Spend about $25 a month on postage and envelopes.

You can say whatever you want in the letter, so long as it's positive. If you want *Voyager III* launched next week, say so. If you want a project startup for a manned expedition to Titan, say that—just don't say, "What I want is right and what the others want is wrong." Your opinion is no more valid than anyone else's—but no less, either. We all live in the country that coined the phrase, "Promise her anything, but give her Arpege." We should demand to be given everything we want.

And that's the low-tech method. I would guess that a sizable percentage of us must now have personal computers. With your word processor's mailmerge feature, you can effortlessly hit every political figure in the United States—your field of targets is limited only by your ability to buy postage stamps.

As individuals, we seem to matter very little to our leaders. But if we speak to them in a loud enough voice—they'll listen. Remember: a few thousand complaint letters gave the Justice Department sufficient justification to violate Constitutional due process considerations in its anti-pornography campaign. A few thousand telegrams made the intrepid committee people of the Iran/Contra hearings afraid to deal sternly with the likes of Ollie North.

After the receipt of 140 million letters, our congressmen will be fighting duels over the right to sponsor pro-space legislation.

WILLIAM BARTON

Chapel Hill, NC

---

Dear Stan,

The continuing passionate debate on birth control, abortion, and population growth seems to me to be "gridlocked." That is, any solution acceptable to one (theological, demographic, economic) school of thought specifically "gores the ox" of one of the other concerned groups. I would like to propose a solution which starts from an alternate, but quite feasible technology; it addresses many of the legitimate concerns of the various groups; it has some interesting, beneficial (at least on a national or global scale), consequences; and exploring it might be either the stuff of editorials, the grist of letters to the editor, or the skeleton for one or more novellas.

All alternatives for the control of population which have been advocated to date fall into two broad groups. Abortion (and perhaps the "morning after" pill) does not attempt to inhibit conception but merely prevents development and birth; this is not acceptable to a large

portion of the humanist/religious world. The remaining alternatives rely upon individual "responsibility" in such a fashion that the default outcome, the result when individual responsibility is not exercised, is all too frequently a pregnancy. The "irresponsible" behavior may arise from ignorance, economic deprivation, or any of the other ills of humanity, but the result of this cosmic dice game is to concentrate the accidental births precisely in that part of the world population least able to afford them.

We cannot legislate the problem away. First, no one who would accept the power to "license" births (a not infrequent SF theme) should be entrusted with that power. Second, if the prohibition of alcohol worked as well as we know it did, how can we imagine that prohibition of sex would work any better.

I suggest that any workable solution to this problem will have two important characteristics. First, the "default" outcome of irresponsible behavior will be *non-conception*. Second, when conception is desired, it must be freely available to any responsible couple—and "responsible" must be defined in global fashion, not via IQ tests, politics, religious affiliation, etc. More than one system could be devised to meet these criteria but let me illustrate the concepts with a particular example.

Two "medications" are required. The first is a general *inhibitor* of fertility which is to be added to the water supply in much the same fashion as chlorination. The second is an *antidote* to the first which is distributed, free to any takers, but which must be taken in 30 consecutive daily doses to be effective. Use of the inhibitor establishes the "default" condition that doing nothing results in non-conception. The price and the dosage pattern of the antidote assures that, in non-descriminatory fashion, anyone who truly wants children may concieve them by following a simple regimen for one month.

Note how this change in orientation changes many features of the procreation debate. Sex education in the schools becomes a genuine facet of education, not even an incidental how-to manual for avoiding offspring. Should parents object to this dispassionate education, they may boycott it without threatening their children and their community with the private/public tragedy of unwanted pregnancies. Except after amniocentesis, perhaps, abortion no longer needs to be the final option. (And even firm foes of abortion might be more forgiving of the termination of pregnancy in cases of severe genetic deficiency.) Population growth, globally, would slow. I dare not predict whether that slow-down would be slight or drastic, but I suspect that it would be concentrated in those parts of the world where the newborn faces the greatest obstacles—the slums, favelas, ghettos, and barrios.

The system is not totally efficient, nor should it be. All the world doesn't drink from public water supplies, but a very high percentage does. People offended by the "limitation to their freedom" of "contaminating" the water supply can drink bottled water, construct cisterns, and the like. As this represents forward planning for a defined goal, it seems like a satisfactory definition of "responsibility" (as I used it above) and should not be discouraged. The antidote should be widely available, not just doled out by government. Almost the only restriction on its availability that occurs to me is that it should not be offered in timed-release versions. Even in this case, purchasing a black-market

version at least demonstrates deliberate planning ahead.

The ideal system should operate on both sexes uniformly, even if this means four "medications" rather than two. More than just the perception of fairness lies behind this. Procreation is far too important to become a tool for manipulating one's partner and "responsible" behavior should encompass a mutual decision, not one individual's unilateral choice.

This concept seems well within the existing or soon to be available technology. You, and the talented folk who contribute to *Analog*, can elaborate on this basic theme at your leisure. My first goal is to approach the all-too-real problem of the population bomb from some perspective that is outside the "gridlock" of the present debate. If this is a useful first step toward that end, I'm delighted.

GORDON R. LOVE

Williamstown, MA

---

Dear Stan:

I think the last time I read something by L. Sprague de Camp in *Analog* I was so incensed that I fired off a letter to Ben Bova. This time I'm writing because I agree with him, not disagree with him.

Those who consider expansion into space a solution for the population problem might consider that the space available will almost certainly be some function of $T$ cubed and the population to fill it will almost certainly be some function of $E$ to the $T$. A bit of contemplation of the necessary relationship between these two functions might be instructive no matter what constants you tack on.

ROLAND L. PORTER

Santa Cruz, CA

P.S. I think that sometime in the distant future a historian will address himself to the question, "When did civilization begin?" and will come up with a date sometime in the future from us. A probable criterion will be a civilization is *a self-contained group of sentients who have rational quantitative and qualitative control over both their population and environment.*

---

Mr. Schmidt:

I hate to appear naive but I am relatively new to the short story business. You see, I just received a subscription to *Analog* by mistake as a gift but what a great mistake it was!! I am overjoyed by each issue so far, especially Timothy Zahn. Anyways, what I meant to ask was, could you publish a short little definition of what classifies short stories, novellas, novelettes, and novels into their own seperate categories.

JOSH R. JAGGARS

*Our definitions of story categories are based solely on length, and they're the same ones used by the people who gun the Hugo and Nebula awards:*

*Short story: Up to 7500 words*
*Novelette: 7500-17,500 words*
*Novella: 17,500 to 40,000 words*
*Novel: 40,000 words and up* ■

---

●The eternal silence of these infinite spaces frightens me.

**Blaise Pascal**

# a calendar of analog upcoming events

**25-27 March**
STARBASE INDY 88 (Star Trek-oriented conference) at Adams Mark Hotel, Indianapolis, Ind. Guests: George Takei, Mark Lenard, Richard Arnold. Registration—$20 until 1 March, $25 thereafter (children 6-12 half price). Info: Box 304, Carmel IN 46032-0304. Include S.A.S.E.

**1-3 April**
MINICON 23 (Twin Cities area SF conference) at Radisson South Hotel, Minneapolis, Minn. Guest of Honor—Eleanor Arnason, Fan Guest of Honor—Eric M. Heideman, Editor Guest of Honor—Frederik Pohl. Registration—$12 ($6 children) until 12 March 1988, $25 ($10 Children) at the door. Supporting membership—$5. Info: Minicon, Box 8297, Lake Street Station, Minneapolis MN 55408.

**1-4 April**
FOLLYCON (British National SF Convention) at Adelphi Hotel, Liverpool, Eng. Guests of Honour—Gordon R. Dickson, Gwyneth Jones, Fan Guest of Honour—Greg Pickersgill. Registration—£18/$30 attending, £12/$20 supporting. Info: Follycon 88, 104 Pretoria Road, Patchway, Bristol BS12 5PZ. U.S. Agents—Bill & Mary Burns, 23 Kensington Court, Hempstead NY 11550.

**15-16April**
I-CON VII (Long Island SF conference) at S.U.N.Y. Stony Brook, N.Y. Registration—$14 until 31 March, $16 at the door. Info: I-Con VII, Box 550, Stony Brook NY 11794 (include S.A.S.E.) or (516) 632-6460 between 1300 and 1700 Eastern time.

**18-21 April**
General meeting of the American Physical Society at Baltimore, Md., Info: A.P.S., 335 East 45th Street, New York, NY 10017.

**29 April-1 May**
AMIGOCON 3 (West Texas SF & Fantasy conference) at the Holiday Inn-Sunland Park, EL Paso, Texas. Guest of Honor—George Alec Effinger, Artist Guest of Honor—Brad Foster. Registration—$12 until 22 April, $15 thereafter; $7.50/day. Info: Amigocon 3, Box 3177, El Paso TX 79923. (915) 542-0443.

**29 April-1 May**
SWASHBUCKLIN' CONTRAPTION (Ann Arbor SF conference) at Southfield Hilton, Southfield, Mich. Pro Guest of Honor—Octavia Butler, Fan Guest of Honor—Arthur Hlavaty. Registration—$12 until 1 March, $15 thereafter and at the door. Info: Box 2285, Ann Arbor MI 48106.

**1-5 September 1988**
NOLACON II (46th World Science Fiction Convention) at Sheraton Hotel & Towers, Marriott Hotel, Rivergate Convention Center, New Orleans, La. Guest of Honor—Donald A. Wollheim, Fan Guest of Honor—Roger Sims TM—Mike Resnick. Registration—Attending $60 until 31 December 1987, $70 to 10 July 1988. Supporting—$30. 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 nominate and vote for the Hugo awards and the John W. Campbell Award for Best New Writer. Info: Nolacon II, 921 Canal Street #831, New Orleans LA 70112 (504) 525-6008.

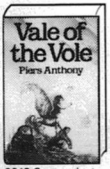
—Anthony Lewis

*Items for the Calendar should be sent to the Editorial Offices six months in advance of the event.*

# TAKE ANY 5 BOOKS FOR $1

## WITH MEMBERSHIP.

SEE OTHER SIDE FOR ADDITIONAL SELECTIONS.




**3913** Spec. ed. ▲
Club ed. $5.98


**4242** Pub. ed. $16.95
Club ed. $5.98


**1362** Pub. ed. $14.95
Club ed. $5.98


**3921** Pub. ed. $17.95
Club ed. $4.98


**3475** Pub. ed. $15.95
Club ed. $4.98

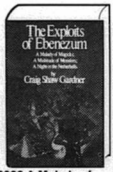

**4226** Pub. ed. $15.95
Club ed. $4.98


**3814** Spec. ed. ▲
Club ed. $10.98


**4234** Pub. ed. $17.95
Club ed. $6.98


★ **3236** Pub. ed. $19.95
Club ed. $9.98


**4275** Pub. ed. $17.95
Club ed. $4.98




**3830 A Malady of Magicks; A Multitude of Monsters; A Night in the Netherhells.**
Spec. ed. ▲
Club ed. $6.98


**5520 The Sleeping Dragon; The Sword and the Chain; The Silver Crown.**
Spec. ed. ▲
Club ed. $8.98


★ **3731 Night's Master; Death's Master; Delusion's Master.** Spec. ed. ▲
Club ed. $8.98


★ **3715 Delirium's Mistress; Night's Sorceries.**
Spec. ed. ▲
Club ed. $7.98

▲ Exclusive hardcover edition

★ Explicit scenes and/or language may be offensive to some.

***How the Club Works:*** You'll receive your 5 books for only $1 (plus shipping and handling) after your application for membership is accepted. We reserve the right to reject any application. However, once accepted as a member, you may examine the books in your home and, if not completely satisfied, return them within 10 days at Club expense. Your membership will be canceled and you'll owe nothing.

**About every 4 weeks** (14 times a year), we'll send you the Club's bulletin, *Things to Come*, describing the 2 coming Selections and a variety of Alternate choices. In addition, up to 4 times a year you may receive offers of special Selections, always at low Club prices. If you want the 2 Selections, you need do nothing; they'll be shipped automatically.

**If you don't want a Selection,** prefer an Alternate or no book at all, just fill out the convenient form always provided and return it to us by the date specified.

**We allow you at least 10 days** for making your decision. If you do not receive the form in time to respond within 10 days and receive an unwanted Selection, you may return it at our expense.

**As a member you need buy only 4 books** at regular low Club prices during the coming year. You may resign anytime thereafter or continue to enjoy Club benefits for as long as you wish. One of the 2 Selections each month is only $4.98. Other Selections are higher, but always much less than hardcover publishers' editions—UP TO 65% OFF. The Club offers more than 400 books to choose from. Each volume printed on our special presses is produced on high-quality acid-free paper. A shipping and handling charge is added to all shipments. Send no money now, but do mail the coupon today!

## SCIENCE FICTION BOOK CLUB®

Garden City, NY 11535

**I want the best SF in or out of this world!** Please accept my application for membership in the Science Fiction Book Club. Send me the 5 books I have numbered in the boxes below, and bill me just $1 (plus shipping and handling). I agree to the Club Plan as described in this ad. I will take 4 more books at regular low Club prices in the coming year and may resign anytime thereafter. SFBC offers serious works for mature readers.

| 1. | 2. | 3. | 4. | 5. |
|---|---|---|---|---|

CT-952

Mr.
Ms. _____
(Please print)

Address _____ Apt. # _____

City _____

State _____ Zip _____

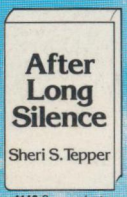
If under 18, parent must sign _____

The Science Fiction Book Club offers its own complete hardbound editions sometimes altered in size to fit special presses and save you even more. Members accepted in U.S.A. and Canada only. Canadian members will be serviced from Canada. Offer slightly different in Canada. 38-SF02

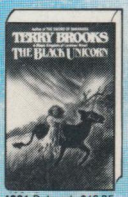
# ATTENTION

**GET READY TO JOURNEY TO EARTHS UNKNOWN...TAMPER WITH EVOLUTION ...HELP SOLVE INTERGALACTIC TURMOIL... AND MEET NEW FORMS OF ALIEN LIFE. IT ALL BEGINS WITH MEMBERSHIP IN THE SCIENCE FICTION BOOK CLUB. IF INTERESTED, JOIN TODAY!**

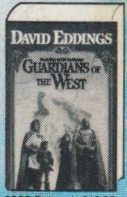

**3939** Pub. ed. $17.95
Club ed. $5.98



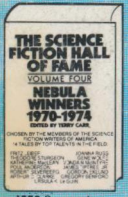

**4143** Spec. ed. ▲
Club ed. $4.98



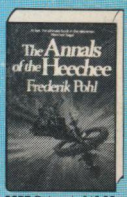

**4861** Pub. ed. $16.95
Club ed. $5.98



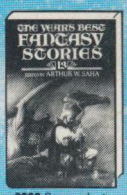

**3806** Pub. ed. $16.95
Club ed. $6.98



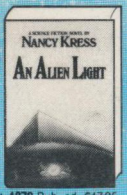

**4259** Spec. ed. ▲
Club ed. $6.98



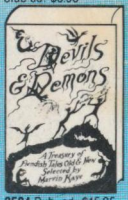

**3657** Pub. ed. $16.95
Club ed. $4.98



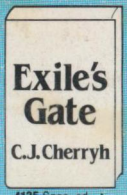

**3889** Spec. ed. ▲
Club ed. $4.98




★ **4879** Pub. ed. $17.95
Club ed. $5.98

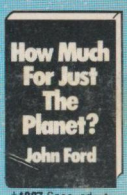



**2584** Pub. ed. $15.95
Club ed. $6.98

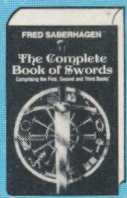



**4135** Spec. ed. ▲
Club ed. $5.98

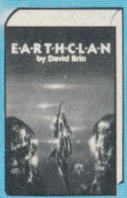

**3723** Pub. ed. $16.95
Club ed. $4.98



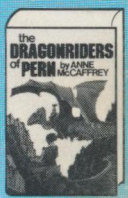

†**4887** Spec. ed. ▲
Club ed. $4.98




**1420 Includes the First, Second, and Third Books.**
Spec. ed. ▲
Club ed. $7.98

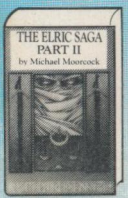



**4218 Startide Rising; The Uplift War**
Spec. ed. ▲
Club ed. $9.98




**2543 Dragonflight; Dragonquest; The White Dragon.**
Comb. pub. ed. $26.85
Club ed. $7.98


**0752 Elric of Melniboné; The Sailor on the Seas of Fate; The Weird of the White Wolf.**
Spec. ed. ▲
Club ed. $6.98




**1172 The Vanishing Tower; The Bane of the Black Sword; Stormbringer.**
Spec. ed. ▲
Club ed. $7.98


**0075 The First 5 Amber Novels. 2 vols.**
Comb. pub. ed. $32.30
Club ed. $8.98

# TAKE ANY 5 BOOKS FOR $1

**WITH MEMBERSHIP.**

SEE OTHER SIDE FOR ADDITIONAL SELECTIONS.

# SCIENCE FICTION BOOK CLUB®

▲ Exclusive hardcover edition
★ Explicit scenes and/or language may be offensive to some.