MAY 1976 $1
02028

analog

SCIENCE FICTION

SCIENCE FACT

MINOTAUR IN A MUSHROOM MAZE
Richard and Nancy Carrigan

George O. Smith

Gordon Eklund

An open letter to Dino De Laurentiis

CINEFANTASTIQUE Vol 5 No 1

Dino De Laurentiis was the first of two major Hollywood producers to embark on filming a remake of the 1933 film classic KING KONG. Production of his film and one at Universal Pictures is now underway, both using an actor in an ape costume. In CINEFANTASTIQUE Vol 5 No 1 Paul Mandell writes "An Open Letter To Dino De Laurentiis" to let Dino and his Universal film rivals know where they went wrong. Mandell points out first of all how dumb it is to want to remake KING KONG, secondly, how the filmmakers have compounded their stupidity by attempting to do so by using any method other than model animation, the technique employed by Willis O'Brien in 1933 to make the original film so unique and so remarkable.

Will our letter do any good? Not as long as there is a fast buck to be made. Also featured in the same issue is a production article by Don Shay on the filming of A BOY AND HIS DOG, based on the award-winning story by Harlan Ellison. The piece is illustrated with full-color photographs and a beautiful full-color cover painted by west coast illustrator Jim Thomas. In uncovering the story behind the film's production, Shay interviewed both Harlan Ellison and the film's producer/director/writer, maverick L. Q. Jones. A BOY AND HIS DOG is unlike any other science fiction film ever made. And if you didn't take advantage of our offer in the February Analog, you can still begin your no-risk trial subscription with Vol 4 No 4, with 20 pages devoted to THE DAY THE EARTH STOOD STILL! CINEFANTASTIQUE is a unique experiment in publishing, a glossy, full-sized 48 page magazine with 8 pages of attractive full-color printing! Try it.

CINEFANTASTIQUE, P.O. BOX 270, OAK PARK, ILLINOIS 60303 USA

Rush me Volume 4 Number 4 of CINEFANTASTIQUE and bill me $10.00 for a one year, four issue subscription. I understand that if I am not satisfied with the magazine for any reason I may return it and pay nothing. I will also receive details about the fifteen back issues still available.

Name.....

Address.....

City.....State.....Country.....

To obtain a full-color 8 1/2 x 11 inch reproduction of the art above, order a no-risk trial subscription to CINEFANTASTIQUE, then rip out page 41 of the Vol 5 No 1 issue.

SAVE 50%!

REG. $30.00 VALUE SPY SCOPE

6X15 MONOCULAR NOW $14.95 ppd.

Fantastic bargain in a fine sighting instrument. Top quality 6 × 15mm Spy Scope, a $30 value, is now offered at $14.95! Our special purchase saves you 50% . . . and you get fully coated optics; 393-foot field of view. Weighs just two ounces—stores in pocket, purse, glove compartment. Fits in your palm, so you can peer into hard-to-see places without letting your subject know you're spying. Great for bird-watchers and racing fans. Includes neck strap, leatherette 3½ x 1½ x 2" case. Beautiful brushed metal finish. At this special low price, buy *two*—one for you, one for a gift!

STOCK NO. 1568A ..... JUST $14.95 ppd.

GIANT FREE CATALOG!

NEW 172 Pages Over 4,500 Unusual Bargains for Hobbyists, Schools, Industry

JUST CHECK COUPON!

COMPLETE AND MAIL COUPON NOW

EDMUND SCIENTIFIC CO. 300 Edscorp Bldg., Barrington, N. J. 08007

SEND FREE 172 PAGE CATALOG "A"

BANKAMERICARD master charge

Send me:

_____ Spy Scope(s)

No. 1568A @ $14.95 ea. ..... $_____

☐ Charge my BankAmericard

☐ Charge my Master Charge

Service and handling charge $____1.00

Interbank No. _____

Card No. _____

Enclosed is

☐ check ☐ m.o. in amount of $_____

Expiration Date _____

Signature _____

30-DAY MONEY-BACK GUARANTEE. You must be satisfied or return any purchase in 30 days for full refund.

Name _____
(Please Print)

Address _____

City _____ State _____ Zip _____

EDMUND SCIENTIFIC CO.
300 EDSCORP BUILDING
Barrington, N. J. 08007

(609) 547-3488

America's Greatest Science • Optics • Hobby Mart

HELPING TO DEVELOP AMERICA'S TECHNOLOGY FOR OVER 30 YEARS

BEN BOVA
Editor
DIANA KING
Associate Editor
HERBERT S. STOLTZ
Art Director
EDWARD MC GLYNN
Advertising Sales Manager
GERALDINE PRASIOTIS
Advertising Production Manager

analog SCIENCE FICTION SCIENCE FACT

Next Issue on Sale June 4, 1976
$9.00 per year in the U.S.A.
$1.00 per copy
Cover by Kelly Freas

Vol. XCVI, No. 5 / MAY 1976

SERIAL

NOVELETTES

SHORT STORIES

SCIENCE FACT

READER'S DEPARTMENTS

Editorial and Advertising offices: Condé Nast Building, 350 Madison Avenue, New York, New York 10017
Subscriptions: Analog Science Fiction/Science Fact, Box 5205, Boulder Colorado 80302

We like to tell each other that science fiction is *the* literature of ideas, and that science fiction people are always open to new concepts. "No future shock for us," we say, "because we realize that *change* is the most important factor in human experience."

True, up to a point. Unfortunately, sometimes our thinking gets into ruts. The bold new ideas we deal with become clichés eventually, and too often we like those ideas so well that we don't bother to update them or go out and develop new ones.

For example: most science fiction stories about the future of space exploration and colonization assume that human settlements will be established on the Moon and Mars within the next half-century. Further outposts of humanity will be set up on Mercury, and the satellites of Jupiter and Saturn. Colonization of Venus will be impossible for a long time to come because of the planet's incredibly inhospitable surface conditions: choking carbon dioxide atmosphere as thick as overcooked chicken gumbo soup, and temperatures hot enough to melt aluminum.

Yet this overworked, predictable scenario was already out-of-date in the 1950s. It was obviously naive because no one had asked the basic questions: *Why* would any human society spend the money, time and effort necessary to colonize the Moon or another world? Where would the profit be for the people who pay the bills? (And also, how do you make a space transportation system efficient enough to carry colony-sized payloads?)

No nation, no corporation, no society is going to colonize *anyplace* just to satisfy the predictions of science fiction writers. The Apollo project landed astronauts on the Moon not because Delos D. Harriman cajoled us into doing it, but because our political leaders found it expedient to demonstrate our

technological superiority to the world.

More on that later. Let's take another example, this time from the social sciences. The future societies depicted in most science fiction stories are depressingly unimaginative. Interstellar empires (if you can believe that they could exist!) are modeled either on the Roman or British imperial systems. Smaller social units are portrayed either as some variation of feudalism, if they're backward; or modern American industrialism; or a totalitarian regime *à la* Nazi Germany or Soviet Russia. If a society's really backward, or just immature, we get a modern American's version of Paleolithic hunting tribes. Out of all the possibilities of human interactions, most science fiction writers cling to the tiny slice of European social structure that they learned (often incompletely) in public school.

Occasionally a writer will produce a story in which a human society is patterned after the social insects, or some other animal species. Usually these stories don't work out well because people don't think or behave like bees, termites, Thomson's gazelles, or turtledoves. Trying to squeeze human characters into the social patterns of an ant can get pretty ridiculous, unless the writer is trying to make an allegory. And it takes a very good writer to make a successful allegory.

When existing information is no longer sufficient for your purposes, the only sane thing to do is go out and get more information. Unfortunately, too many writers have fallen into the habit of depending on the "old reliable" ideas and information. In a universe of change, they continue to produce stories that are weary, stale, flat and unprofitable.

On the other hand, there's a world of ideas and information surrounding us. Despite political setbacks and funding woes, scientists are still thinking, investigating, studying, and producing the basic raw material for good, strong, vital, new science fiction stories.

Consider three books: **Cows, Pigs, Wars, and Witches: The Riddle of Culture,** by Marvin Harris (Random House); **The Third Industrial Revolution,** by G. Harry Stine (Putnam); and **Pioneer Odyssey, Encounter with a Giant,** by Richard O. Fimmel, William Swindell, and Eric Burgess (NASA SP-349).

Burgess and Stine are no strangers to Analog's audience. But it is Harris' book that offers the most challenging new ideas (sorry, Harry and Eric). An anthropologist at Columbia University, Harris has set out to examine, in his own words, "The causes of apparently irrational and inexplicable life-styles." He goes on to say:

"Some of these enigmatic cus-

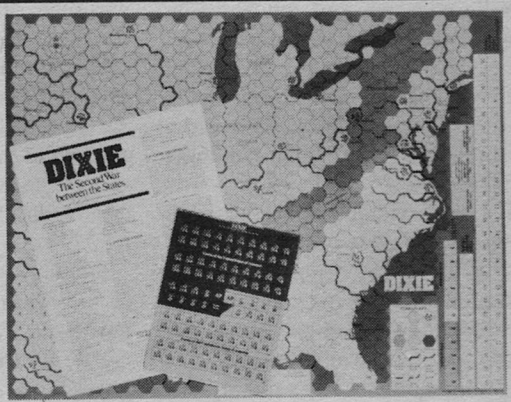
Strategy & Tactics

The military history magazine with a conflict simulation game in it!

Here are just a few of the games that have been published in **S&T** magazine:

- **USN**
- **Winter War**
- **Battle of Moscow**
- **Flying Circus**
- **Borodino**
- **"CA"** (Naval Tactics)
- **Fall of Rome**
- **Kampfpanzer**
- **The East is Red**
- **PanzerArmee Afrika**
- **Tank!**
- **Operation Olympic**
- **American Civil War**
- **Combined Arms**

(Note that all these games are now available in their separate $8 boxed versions.)



DOING HISTORY: Now, instead of merely reading about the great campaigns and battles that shaped the times we live in, you can do it! There's no more exciting way to understand a famous conflict than commanding the units that made the history. Directing the troops over a map of the actual battlefield, watching the shift and flow of the changing front lines as your forces advance, retreat, and counter-attack. Every other month, subscribers to **Strategy & Tactics** get a chance to do exactly that. They do it by using the conflict simulation game that comes in every issue of **S&T**.

CONFLICT SIMULATIONS are serious games that enable you to recreate famous military situations and replay them, something like a game of chess. To understand. To solve. To win where others lost.

YOU'LL GET a ready-to-play simulation game in each issue of **S&T**, including a large terrain map, die-cut playing pieces, and complete rules. You'll also get two feature length historical articles (one which deals with the same subject as the game) plus game and book reviews, and commentary on simulations development.

SUBSTANTIAL DISCOUNTS are available to **S&T** subscribers on our separate line of over seventy historical games. (See the coupon for a partial list.)

A FREE INTRODUCTORY GAME will be sent to all new S&T subscribers: Strike Force One, a hypothetical US/Soviet confrontation presented in a game design specially created to introduce you to conflict simulations.

Simulations Series Games are now in stores, nation-wide!

Send check or money order to:
SIMULATIONS PUBLICATIONS, INC., Dept. 661
44 East 23rd Street, New York, N.Y. 10010

Please enter my subscription to **Strategy & Tactics** for

☐ **1 year** (6 issues): $14.00 ☐ **2 yrs.** (12 issues): $26.00
☐ **3 yrs.** (18 issues): $36.00 ☐ **6 mos.** (3 issues): $9.00
☐ current issue (not pictured above): $5.00 ☐ free brochure

Send me the following Simulation Series Games:

☐ **World War II** (ETO, 39-45): $8 ☐ **Patrol** (infantry tactics): $8
☐ **Frigate** (sailing ship tactics): $8 ☐ **StarForce** (space-war): $8
☐ **Desert War** (armor tactics): $8 ☐ **NATO** (Soviets vs. West): $8
☐ **American Revolution:** $8 ☐ **Sinai** (Arab-Israeli): $8
☐ **Austerlitz** (Napoleonic): $8 ☐ **Lee Moves North:** $8

name _____

street _____ apt # _____

city _____ state _____ zip _____

Prices apply to US & APO/FPO only. Subject to change without notice.

OFFICE USE ONLY: Cus Code Total $ Credit Postage Tax

toms occur among preliterate or "primitive" peoples—for example, the boastful American Indian chiefs who burn their possessions to show how rich they are. Others belong to developing societies, my favorite being the Hindus who refuse to eat beef even though they're starving. Still others have to do with messiahs and witches who are part of the mainstream of our own civilizations. To make my point, I have deliberately chosen bizarre and controversial cases that seem like insoluble riddles."

His point is that even the most wildly inexplicable examples of human behavior can be understood as responses to the social, geophysical, and economic environment of the people involved. For example, Harris compares a Hindu's eating his "sacred cow" to an American's burning down the factory in which his farm machinery is made.

For science fiction people, Harris' book is a gem. The man goes in and investigates the way human societies *work*. He studies and prods beneath the surface of things, in an effort to find out why people behave the way they do. You may not agree with his conclusions in each case, but they will provide several banquets' worth of food for thought.

The lesson Harris has to teach science fiction writers is this: if we can understand the way existing and historic human societies have worked, then we can begin to understand how to construct future societies that are not merely copies of high school history texts.

The techniques Harris uses, and the way the man thinks, offer a primer to any writer who desires to construct valid and viable fictional societies, whether they be future variants of human societies on Earth, or alien societies set on other worlds. You start with the geophysical facts—the landscape, the climate, the natural resources—and build from that foundation a society that is ecologically fitted into its environmental niche.

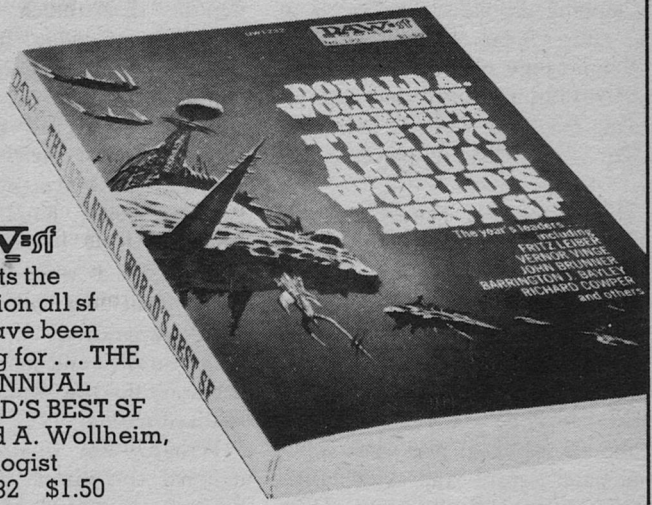
Getting back to the colonization of the Solar System, it seems obvious that our first space colonies will not be on the Moon, or even in the Lagrangian orbital positions championed by Professor Gerard O'Neill and his Princeton cohorts. As G. Harry Stine pointed out in the January and February 1973 issues of this magazine, the first large-scale migration of human beings off-world won't go very far—a mere couple of hundred kilometers.

The Third Industrial Revolution makes a convincing case for the idea that we can—and should—begin to develop industrial factories in space. Far from being an inhospitable, difficult and dangerous environment, the zero-gravity world of factories in orbit around the Earth offers tremendous advantages

"Wollheim is a reader's editor
. . . a first-rate collection."—*Booklist*

"Excellent"—*Locus*

"Excellent"—*New York Post*



DAW BOOKS presents the collection all sf fans have been waiting for . . . THE 1976 ANNUAL WORLD'S BEST SF
Donald A. Wollheim, Anthologist
UW1232 $1.50

THE EXCLUSIVE SCIENCE FICTION LINE
Selected by Donald A. Wollheim

DAW BOOKS Distributed by
The New American Library

NAL
TIMES MIRROR

010 01

The New American Library
P.O. Box 999, Bergenfield, N.J. 07621

Please send me ..... copies of UW1232 THE 1976 ANNUAL WORLD'S BEST SF at $1.50 plus 25¢ postage and handling (check or money order—no currency or C.O.D.'s).

Name_____

Address_____

City_____ State_____ Zip_____

Allow three weeks for delivery

over ground-based industrial operations.

The best of these advantages is the effect large-scale orbital industries could have on Earth itself. We can escape the inevitable doom of the "Limits to Growth" argument by tapping the natural resources of the entire Solar System, while at the same time moving most industrial operations off-planet and allowing our homeworld to become a clean, green, pleasant place to live in.

Unlike earlier predictions of space colonization, Stine's proposals make economic and social sense. You can see reasons for spending the money and effort to make the Third Industrial Revolution a reality. There is a profit motive for almost everyone on Earth, in the economic, political and even environmental sense. And with large-scale industrial operations in orbit, prospectors and miners will comb the Moon and the asteroids for metals and minerals: the Moon because it's the closest "mine" we have (closer, in energy costs, even than the Earth) and the asteroids because heavy metals are there and they can be transported Earthward by fairly simple and cheap methods, such as nuclear "shaped charges" that will provide enough thrust to nudge whole asteroids into orbits close to the Earth-Moon system.

Put Harris' book and Stine's together, and you can begin to draw marvelous scenarios about future human societies on Earth and in space. The variations are practically limitless.

For example: What happens to the Middle East when the Third Industrial Revolution makes the oil deposits there much less valuable than they are today? In a recent issue of *Science* magazine, a report spoke gloomily of the chances that the oil-producing nations can quickly convert their immense inflow of cash into a modern industrialized society. Saudi Arabia and Iran will still be backward and overpopulated with illiterates, the report concludes, because it takes many generations to develop the administrative and managerial skills necessary to run a modern industrialized nation.

Perhaps. But what if an international corporation goes into the business of "developing" new societies? Such a corporation could send a team of administrators, managers, and teachers to Iran, for instance, to begin the rapid buildup of that nation's industrial and economic base, while at the same time teaching the natives how to do the job. The corporation would have a contract with the Iranian government, the Shah would have his army to make sure that the corporation didn't try to become politically active. With modern administrative techniques, computers, electronic communications, and teaching techniques that are not

hampered by academic fussiness, a nation like Iran might become administratively self-sufficient in a remarkably short time.

The key to such a scenario is the ability to work out new solutions to the problems being faced, rather than wringing your hands over the inability of the old solutions to get the job done. In 1941, just before the United States entered World War Two, every shipbuilder in the land *knew* it took four years to build a capital ship, such as an aircraft carrier. By late 1942, after a year of war, the US Navy had exactly two carriers left in the entire Pacific. By late 1944, the Navy had more than a hundred carriers. New ways of constructing them had been found, some of them ridiculously simple, such as working triple shifts.

Pioneer Odyssey is a thorough, and thoroughly beautiful, report on the Pioneer 10 spacecraft mission to Jupiter. Every aspect of the mission is shown in careful detail, from the original planning of the mission to the last-minute "interstellar cave painting" that was affixed to the spacecraft. Burgess and his co-authors have done a lovely job.

Now that we know so much more about Jupiter, we must all rethink the story possibilities of the giant planet. Jupiter's intense magnetosphere bathes its inner satellites with radiation that would be lethal to humans. Does that mean we can no longer deal with stories set on Io, Callisto, Gannymede or Europa? Or must we get inventive enough to find ways to allow human explorers and engineers to live and work in deadly radiation fields? Remember, water will be the most precious resource in the entire Solar System, off Earth, and it appears that the closest sure waterhole to us is Jupiter and its satellites.

Jupiter itself is a new world for us to explore in our stories. There's energy radiating up from below those surface clouds. There are complex chemical compounds in those clouds, and perhaps biological activity below them. Can we ever explore Jupiter? And if we do, and we find living creatures there, how will we be able to determine if they're intelligent or not?

There are worlds within worlds, waiting for new human insights that will turn them into memorable science fiction stories. To cite from the dedication of *Pioneer Odyssey:*

> "This book is dedicated to all the citizens of the United States of America who have made this program of interplanetary exploration possible and who, along with all mankind, will benefit from the increased awareness of the universe and how the Earth and its peoples relate to it."

Science fiction writers, please take notice!

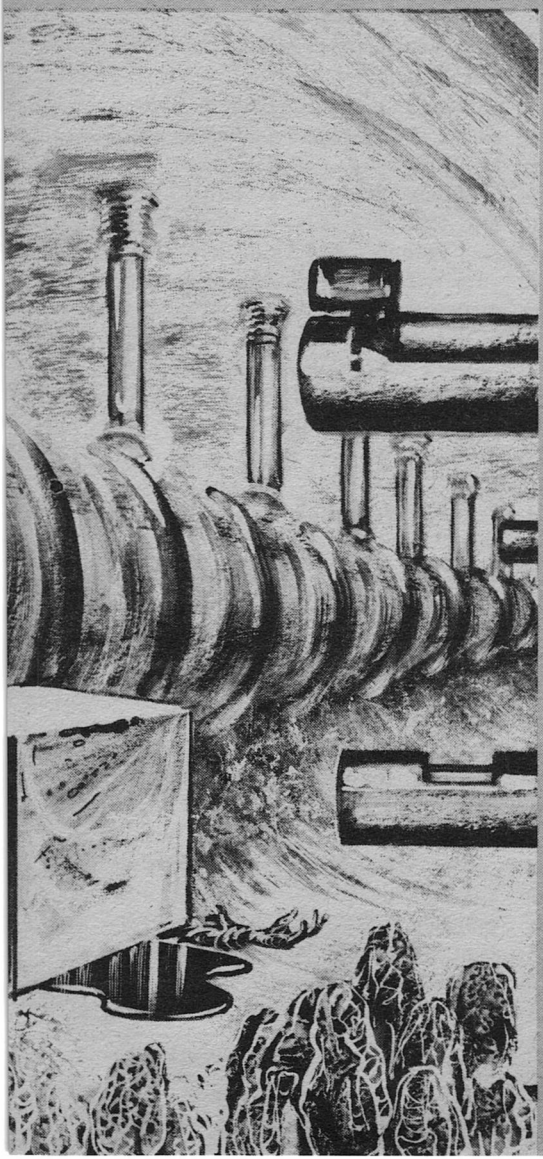
THE EDITOR


KELLY FREAS

Part One of Three Parts.
The arcane academic world of subnuclear physics is nothing but an Ivory Tower, eh?

minotaur in a Mushroom Maze

RICHARD and NANCY CARRIGAN



KELLY FREAS

Authors' Note:

To the best of the authors' knowledge the petron, *the elementary particle which plays such a pivotal role in this adventure, does not exist. Some adjunct properties resemble those of another possible particle, the magnetic monopole. (See, for instance, R.A. Carrigan, Jr.,* et al, Physical Review *D. 3867: 1974.) In August, 1975 experimenters detected evidence for a magnetic monopole but the work has not yet been confirmed. The petron is also presumed to initiate a process similar to muon catalysis. An article by J. D. Jackson (*Physical Review 106, *330: 1957) contains an interesting speculation on this subject. To repeat, petrons don't exist. But just suppose they did . . .*

Another fish landed with a wet slap on the worn wooden planking of the wharf as Howell Wilton, captain of the charter *Lucky Duck*, flipped the day's catch from the boat into a neat pile. Mario Petronelli, his back turned on the fish with studied indifference, stood gazing at the sunspecked waters of the bay. Watching the little tableau, Silverman tried hard to keep the laughter out of his eyes, but there it was.

If Petronelli hadn't been so damn pompous when he explained the scientific way to bait a hook to the New York garment manufacturers who had shared the *Lucky Duck*'s dubious comforts with them that day, they might not have been so hard on him when his own line kept coming up empty. How could they have known that the cocky little Italian was one of the greatest high energy physicists in the world and that, to anyone who knew a pion from an electron, his word was gospel?

Silverman ambled over to Wilton as the charter captain jumped nimbly from boat to wharf.

"Guess that's it, Professor," Wilton told him. "Nice catch today . . . though I feel kinda bad about your friend." He glanced dubiously at Petronelli's rigid back.

The other suppressed a chuckle. "Don't worry. I'm sure the trip was, ah . . . an education for him. Are you going to the Locker?"

"Yeah. Soon's I get these fish iced."

"OK. We'll meet you over there then."

As he started over to where his friend was standing, a long low whistle from Petronelli caused him to pause and follow the other's gaze across the bay. Wilton did the same and his eyes narrowed in envious admiration. Silverman could see why, for flying lightly over the glittering water came an ocean-going hydrofoil.

She was of the submerged-foil variety—all gleaming white and polished brass and rich mahogany—trim as the gulls who, disturbed from their lazy rocking on the waves, rose and circled above her.

The ship slowed and settled gracefully onto the water. Power purred from her engines as she glided up to the gas pumps and backed. In a harbor where luxury yachts often berthed with the tough little boats of the commercial fishing fleet, she spelled opulence with a capital "O."

Silverman tapped Petronelli's shoulder and nodded in the direction of the beautiful ship.

"Now there's something you can spend your prize money on when your experiment is finished."

Petronelli smiled with a modesty which fooled neither man.

"I don't think Mr. Nobel would even pay for her gas," he replied, "but it's a pleasant thought, isn't it?"

And, reminded of the exciting threshold on which he stood, the ignorance of the garment men and of the fish who had disdained his superior hook was forgotten. Petronelli agreed with good humor to Silverman's suggestion of a drink at Davey Jones' Locker. By the time they reached the red shack at the end of the wharf which served as one of the most informal yacht clubs on Long Island, the two men were deep into a discussion of their beloved physics.

"Hey, Professor," boomed the hearty giant behind the bar as they entered. "Good to see you again. Any luck today?"

"Not bad, Davey. How's business?"

The giant laughed. "Nobody ever quits drinkin' around here, Professor."

"Especially with that good beer you've got."

"Say, I want you to meet a friend of mine. He's over at Brookhaven on loan from California. Dr. Petronelli, meet Davey Jones."

"Pleased to meetcha," Davey yelled, extending a huge hand that swallowed up Petronelli's small one. "I did a lot of the construction on that place when they were building it. Quite a thing they do there at that lab . . . quite a thing. 'Course I don't really understand it much.

"What can I get you to drink? I know what he wants," Davey said, nodding at Silverman. "Elbschoss—right?"

Silverman nodded. Petronelli ordered a Galliano. They were carrying their drinks to one of the two long, well-worn trestle tables when the screen door to the Locker squeaked and banged.

Davey Jones' eyebrows rose slightly as he looked over this new customer. Pretty classy!

The man stood out from the rough-shirted fishermen who usually came to the Locker the way his white hydrofoil stood out from their rugged fishing boats, for Silverman recognized him as the man who had stood at the wheel of that ship as she had glided past him to the gas pumps.

As the newcomer stepped through the oblong of light into the whiskey-tainted gloom of the bar, he paused to let his eyes adjust to the shade. He had it all—flawlessly tailored cashmere shirt, hand-made leather jacket just matching the pale buff boating shoes, not a hair of the well-barbered gray head out of place.

He wore his shirt open at the neck. In fact it seemed unlikely that any shirt could be made to button around that thick column of suntanned flesh. The breadth of the neck made the man's head seem too small. It disappeared into shoulders so heavy that neck and shoulders became one single mass of muscle.

The man crossed over to Davey and ordered a shot of Jack Daniels which he brought to the table across from where Silverman and Petronelli sat.

Next to his drink he set a leather case which he proceeded to unzip with a flourish of one perfectly clipped, buffed, and manicured hand. From its green velvet nest inside the case, he drew out a neatly-turned column of dark oak which appeared to be made by stacking seven discs of wood one on top of another. This he proceeded to screw onto a flat base with a circular well carved into it.

Mario Petronelli's eyes lit up in recognition.

"Ah! A tower game," he said. "I have not seen them often in this country—only in Europe."

The stranger turned to the Italian. "That's right. My stepdaughter brought this one from Copenhagen. Do you play?"

Mario allowed himself a smile.

"A bit."

"It's new to me," Silverman volunteered. "How does it work?"

"I suppose you would call it a kind of a maze. It's played with little wooden balls," Petronelli explained. The stranger shook a handful of marble-sized balls out of a leather pouch and showed them to Silverman.

"The white ones are worth five points, the black—one. You feed them into these nine holes at the top of the tower and turn one of the three carved discs—so." The man twisted the middle carved disc a ninth of a turn and there was a wooden click as a ball dropped into the depths of the tower. "You make points when the balls drop out the bottom of the tower into this well here. Twenty-five points wins. It's simple."

"Sounds a little like Russian Roulette," Davey volunteered from behind the bar.

"The stakes are rarely so high," the owner of the game said, clicking the balls enticingly in his hand. "Anyone care for a game?"

Howell Wilton, who had drifted in with some other fishing boat owners, volunteered to play for a round of drinks. The stranger gave him five black and one white ball

and took the same number for himself. They flipped a coin for first turn and the game began.

The fascinated onlookers were silent as the discs turned and they listened to the click of the little balls dropping through the maze of the tower. Then there was a roar of good-natured laughter as the stranger laid the ten black and three white balls he had won in his open hand. Wilton smiled, shrugged, and ordered beers all around.

Petronelli had watched intently and when the noise died again, said in his sometimes too-correct English, "If you would permit me, I should like to try."

The heavy-necked man looked over his dapper challenger and smiled with a friendliness which did not quite reach his eyes.

"Fine with me. Shall we up the ante a little? Make the game more interesting? Say . . . ten bucks a point?"

"But of course. Ten dollars per point."

Silverman stared at his friend. He had never known Petronelli to gamble, and further, he knew that fame was not necessarily synonymous with fortune for a physicist.

Out of pity for the staff who would have to work shift with Petronelli that night, he tried to warn him with a slight shake of his head. To his surprise, Petronelli actually winked at him and turned to his opponent.

"If you will accept a check should I lose."

The man shrugged indifferently and took out a gold money clip. The dim light caught the dull green of a thick fold of bills and an enameled decoration of a golden bull charging across a field of rich blue. He removed two hundred-dollar bills and a fifty from the clip and laid them on the table.

"That should cover me," he said.

Petronelli got out his checkbook and tore out a check.

"To whom should I make this out?"

"The name's Tauroman . . . Clint Tauroman, but most of the time I go by the name of Bull, so that'll do."

"T-A-U-R-O-M-A-N?" Petronelli spelled.

Bull nodded. Davey picked up the stakes and the men settled down to play. Somewhere in the distance a six o'clock whistle blew. Silverman glanced at his watch with a guilty start, and rose quickly from the table.

"I'd like to stay and watch your game," he said, "but it's late and I promised my office I'd check in before dinner. Give my love to Angelina. And good luck with that tower thing."

Petronelli, already absorbed by his new challenge, waved absently at Silverman's retreating back. Davey turned on the lights as the fishermen, drawn by the size of the bet, closed in around the players.

Silverman's last glance caught the silver arc of a coin tossed above the circle of onlookers. The game had begun.

Silverman had really forgotten about Petronelli's gamble when the phone rang in his home later that evening.

"Professor?" said the hesitant voice. "This is Davey Jones . . . from the Locker out at Montauk. I don't like to bother you this time of night, but I'm worried about your friend."

"No problem, Davey. I'm sure his check is good," Silverman replied, his own voice a little surprised.

"Oh, he didn't lose," Davey assured him. "He won . . . over five hundred big ones because Tauroman kept insisting on two out of three, then three out of five . . . well, you know how it goes. Wouldn't believe your friend about all that probability cra . . . er, stuff he said he'd worked out on a computer. Oh no. He won all right."

"Then what's the problem?" Silverman was puzzled.

"It's the other one . . . that Tauroman guy. I've seen lots of bets settled in the Locker, but never a guy who minded losing so much. Oh, he said all the right things and paid up prompt and all, but when that friend of yours left . . . (By the way, does he always sing like that when he's happy?) . . . the look Tauroman sent after him was one of pure hate. I mean I sure wouldn't want nobody looking at me like that." Silverman could hear a shudder in the bartender's voice.

"I just couldn't get it out of my mind. I think your friend's made a real enemy and figured maybe he ought to know," Jones wound down lamely.

"Don't worry. Mario can take care of himself, Davey," Silverman reassured him, "but I'll tell him what you had to say next time I talk to him."

"That'd sure take a load off my mind. Hope I didn't disturb you," Davey apologized again.

"Not at all. Thanks for calling."

Silverman replaced the phone, a frown on his face. But in spite of Davey's worrisome news he suddenly found himself chuckling.

"Five hundred . . . more than he makes at physics, that's for sure. No wonder he was singing."

Silverman felt slightly foolish telephoning Petronelli next morning about Davey's rather nebulous warning. And the two men had no chance to discuss it or anything else for several months afterward. The experiment so completely absorbed the time and energy of the little Italian that all social contact simply ceased for him.

Bull Tauroman, the luckless fishing trip, and even his friend Silverman were forgotten when, several weeks later, he trotted, singing as usual, up the steps of the alumi-

num trailer parked on the floor of the giant experimental hall which straddled the Brookhaven storage rings. Graduate students working with the complicated experimental apparatus set up on the floor near this makeshift office smiled (or winced) as Petronelli's off-key tenor reached them.

"*. . . cielo spunta la bella aurora.*"

The aria broke off as Petronelli greeted the other senior physicist in the group.

"Fredrick, my friend, how have things gone while I was asleep?"

Fredrick Holzman, sandy-haired, quiet, and only slightly less distinguished than his flamboyant partner, held up his hand in combined greeting and warning to silence. Then, in his deliberate way, he finished reading the computer output he had been studying. He removed his glasses and permitted himself a rare smile.

"Wait until you see this printout. It's going better than I'd hoped."

"So?" replied Petronelli, his eyebrows raised expectantly.

Long years of association with Holzman had taught Petronelli that such cautious optimism was the equivalent of that shout of "Eureka!" always shown in cartoons of scientists. He took the thick wad of paper from his partner, sat at his desk, and adjusted his heavy-rimmed reading glasses. The other man sat silently at the other desk, his hands folded, and seemed lost in thought, the smile still hovering about his eyes.

The yards of blue-lined paper folded themselves onto Petronelli's desk as he read through line after line of sterile, gray type. The paper gradually transferred from one pile to the other as he reached the end of the computer output. Petronelli's face became more and more absorbed until at last he gathered the stack of paper neatly and placed it carefully in the center of the desk. He looked at Holzman and saw his own pleasure reflected in his friend's wire-rimmed glasses.

"Yesss," he said slowly, "yes, I see what you mean. I think we're almost there, my friend. Now right here . . ."

He picked up the computer output again and unfolded it to the important spot. Soon the two men were deep in a discussion so technical that even most of their physics colleagues could not have followed it.

That moment had, in fact, been the turning point. For weeks afterwards Mario Petronelli had practically lived at the laboratory. Physics is a demanding mistress and his wife, much as he loved her, was unable to compete with its charms.

Holzman's computer had held out the most alluring temptation of all, that of absolute success—the discovery of an elusive new particle that had baffled scientists for years. No physicist could resist that temp-

tation for mere domestic felicity.

Petronelli drove himself and his group through eighteen and twenty-hour days on a schedule tolerable only because of the exciting possibility that any day might bring discovery of the tiny, elusive goal they sought.

Then one day it was there. The unmistakable trace that would not go away, would not prove itself a false alarm, that insisted upon its own reality. They had found the mysterious particle and success was theirs.

Silverman could see the marks of the long hours of strain on his friend's face as Petronelli swept into the Silverman home for an intimate celebration dinner. The Italian's normally olive complexion looked gray and slack, but his spirits were more ebullient than ever. He flirted with his own Angelina and with Rachel Silverman while his host looked on in amused tolerance.

A happy air hung over the little group. Liqueurs had gone around twice. Dregs of cold coffee lay forgotten in the cups. And the talk was on that most pleasant of subjects—success. Mario was too wound up to let the lateness of the hour and nights of lost sleep send him home. The experiment was still sending constant shots of adrenaline into his veins.

But finally he glanced at his watch and pushed away from the table.

"Regretfully I must leave you, my dear Rachel. It's only here that I can savor *Melazone alla Parmigiana* equal to that of my childhood. But I would eat only dry bread if it meant that I could spend the evening in your delightful company."

What Angelina Petronelli, who was herself a superb Italian cook, thought of her husband's blandishments she alone knew. Rachel Silverman smiled indulgently, the only response she could ever think of to Mario's extravagances.

"I wonder," he continued, "if I could impose upon your good nature to borrow your husband for an hour or so. He has not yet been out to the laboratory to see the setup to which we owe tonight's celebration."

Turning to Silverman he said, "Would you be interested to see the equipment? It's possible that it may become a classic of a sort. Holzman is a master at these things."

"I sure would. In fact I was hoping you'd ask. It'll get me out of helping with the dishes. Do you mind, dear?"

"No. No. Go ahead," Rachel replied.

Angelina Petronelli sighed. The mistress had won yet another night.

"Don't worry," she said. "I'll stay and help Rachel with the cleaning up and drive home when we're done. It's no problem since my car's here anyway." (As usual she

had arrived first and alone since Mario had been held up at the lab.)

At the door Petronelli kissed his wife and raised Rachel's hand to his lips in farewell. "Till later then, my dear. It was enchanting as always," and he swept out the door.

With a sigh and an absent-minded peck in the direction of Rachel's cheek, Silverman followed his friend. His basically generous nature was genuinely delighted at Mario's scientific success, but try as he could he was not able to forgive him his skill at hand-kissing. On the rare occasions when Silverman had tried it, he knew he felt and looked a damn fool. The trouble was, one was good at it or not. There was just no satisfactory way to practice.

A few flakes of snow swirled into their faces as they crossed the lawn to where Mario's dark green XKE crouched in the driveway waiting for its master. When the car had purred into life, Silverman broke the silence.

"This discovery of yours certainly is going to give high-energy physics a shot in the arm, Mario. It needs it with things as tight as they are."

"Yes," Petronelli replied. "It has been hard to get support money lately. We're not the heroes we were after the War when the atomic bomb was so fresh in everyone's mind. You know, I can't understand why people always want us to invent weapons. Surely there are enough of those already . . . more than enough. And there's been so much good physics done since '45—parity and time reversal violation, neutral currents, discovery of more elementary particles than there are natural elements, and now the discovery of the *psi* here and at the SLAC storage rings. It's a respectable list." Petronelli's voice had an air of injury about it.

"Respectable, yes," his companion replied, "but totally incomprehensible to the man-on-the-street and his congressmen. They think in terms of clean water and air, cheap power, *and* unfortunately, a better way to kill. Time reversal's just so much Alice-in-Wonderland stuff to them."

The guard at the laboratory gate shouted a familiar greeting to Petronelli as he waved the green Jaguar through. As the car roared down the straight stretch of road leading to the accelerator and storage rings, Petronelli turned to his friend and prophesied, "Well, perhaps he will learn to love our new little baby, my friend. There is potential there, great potential."

They drove in companionable silence through the deserted streets of the laboratory compound, past the darkened windows of the new, surrealistic cafeteria, the library, and the motley group of red brick and government surplus buildings that served as office buildings. The Long Island night was cool and

pleasant. The few flakes of snow had been a false alarm. Soon the headlights of the car swept across the earthen dike that covered the tenth-of-a-mile circle of the big accelerator. At intervals around the circle the red lights of the access buildings defined the size of the ring.

Now the lights on the access buildings began a pulsing rhythm, flashing their warning that the machine was on, hurling its beam of protons at incredible speeds around the ring of buried magnets. Faster and faster the beam would travel until the protons would crash into waiting targets designed by the experimenters, there to yield up nature's secrets to these men and women trained to read the clues the protons would leave behind.

Sometimes, as tonight, the beam was used to fill a new tool of physics, the storage rings, which lay buried under another, still-larger oval dike just beyond the accelerator. Behind the quiet, frosty facade, the laboratory was far from asleep.

A doe and her fawn grazing on the crest of the storage ring dike raised their heads to watch the XKE as it swung into the sparsely-filled parking lot of Experimental Hall B. Petronelli brought the car to a skidding halt, got out, and briskly slammed his door. At the noise, the two deer turned and fled to the safety of their encircled woods, their tails flashing white for a moment in the starlight.

The bustle inside the hall contrasted sharply with the frosty silence outside. The accelerator to the south made its presence felt in the dimming of the lights as the machine hungrily gobbled up power. Housetrailers wedged against the walls served as offices for the experimenters and from these tired graduate students occasionally emerged to tend the complicated electronic equipment which seemed hopelessly enmeshed in a tangled web of many-colored cables. Overhead the traveling crane creaked as its operator worked overtime positioning Volkswagen-sized concrete shielding blocks around a new experiment just being set up.

Petronelli seemed, if possible, to become even more alive as he strode into his domain. He rushed on ahead of Silverman, humming as he went, eager to show his friend where his "new baby" had been born. Although he was somewhat taller, Silverman had to rush to keep up with the Italian's quick pace.

Everyone he passed in the hall had a question or remark for Petronelli. He seemed to know each person he talked to and even to remember whatever it was they had last discussed with him. His grasp of the field of particle physics amazed Silverman all over again as he listened to the rapid-fire answers Petronelli shot back at his questioners. Perhaps they all hoped his

success would be contagious. They seemed almost to crowd around him as if some of his aura would rub off on them.

Only one person seemed to be a stranger to him—a short, black-haired man neatly dressed in a pin-striped black suit who stopped to offer congratulations in precise and clipped English.

"Professor Petronelli. Allow me to add my congratulations to those you have already received. Your work is a milestone we shall all respect for years to come. May I wish you continued success."

"Thank you. Thank you. I've had an excellent team to work with," Mario answered, unconsciously imitating the other's little bow. The man moved aside and Silverman and Petronelli walked on.

"He's a new one to me," Petronelli remarked to Silverman. "There are so many international visitors around here it's hard to keep track of them all."

"Did you notice his eyes?" Silverman asked.

"No. What about them?"

"It didn't look to me as if they were the same color. One was dark. (You'd expect that, of course, with his dark coloring.) But the other was almost blue. Strange little button he had in his lapel too. It looked like a double-headed ax."

"Humph!" chided his friend. "All that cloak-and-dagger stuff you've gotten into makes you see ghosts behind every door."

They strode past the new experiment being set up near Petronelli's. Above them the crane operator positioned his machine to pick up one last concrete block. The view from his perch just under the high ceiling of the hall gave him an odd perspective on the scene below. He could see the two lines of magnets meeting to form an X where they brought the two proton beams together on their collision course. Lights winked all over—on the magnets, on the counters and spark chambers, on the scopes, adding their bright colors to the streams of color-coded cables thrown like so much psychedelic spaghetti over the floor.

He could see the famous Petronelli striding through the hall followed by a distinguished-looking fellow with steel gray hair and behind them Petronelli's usual group of followers. He'd just move this one last block and then knock off for coffee.

Petronelli and Silverman had reached the steps of the small office trailer. Mario reached up and opened the door, motioning Silverman to enter.

Fredrick Holzman lay dozing on a cot he'd brought in weeks ago, his thin face looking younger and somehow vulnerable without his rimless glasses. The two men, seeing him asleep, turned to go but the physicist awakened with a guilty start.

"Ho, Mario! . . . sorry . . . I was asleep."

Holzman groped for his glasses and put them on. They transformed him into the calm and competent personality the world knew.

"Sorry we wakened you, Fredrick. We'll leave in just a minute, but now you can meet my friend, Dr. Silverman. He should meet, after all, the godfather of the baby if he's to know the whole picture of its life." Petronelli turned to Silverman and explained. "I think we have probably wakened Fredrick from the first sleep he's had in the past twenty-four hours."

"I'm sorry we wakened you," Silverman apologized. "But I'm glad to have the chance to congratulate you myself. Mario tells me you've designed some really classic equipment here."

Holzman's ears turned pink and he smiled shyly, self-consciously brushing back his sparse, light hair. "Yes. I guess we were rather lucky. Say, I'm sorry to run off, but if you'll excuse me, I have to check a counter and get a program typed in before the computer goes over to batch work for the night. Nice to have met you." And he ducked quickly out of the door and was gone.

Petronelli watched him go affectionately.

"I'm sure a shyer man than that one exists, but I've yet to meet him. Fredrick may be shy, but he's a master physicist, my friend.

"But now let me show you what he and I have cooked up. It was that neutral K meson experiment at Fermilab in Batavia that gave me the clue. You remember that it showed . . ."

Talking all the while, Mario blithely wiped clean a formula-filled blackboard marked with a large sign in both Spanish and English commanding no one to erase it. Rapidly he filled the surface with new figures. Silverman sharpened his wits and soon had added a formula or two of his own to the board.

"You're right, my friend," Petronelli answered Silverman's last formula with another one. "That is what we did. And the result is a tidy little vat of our new particles—the only ones in the world."

"And according to these figures they look incredibly stable," Silverman said. "I find it hard to believe. You know one always thinks of accelerator-made particles as so . . . ah . . . fleeting. Look how many only last a trillionth of a second or so."

Petronelli beamed broadly.

"But that's what makes our baby so unusual . . . it's stable as a diamond and just as portable . . . only needs a container and a medium such as oil to suspend it. That's what gives the *petron* (Fredrick named it that. Flattering, don't you think?) such possibilities. Why, I think . . ."

Silverman realized later that he

never did find out what Petronelli thought about the possibilities of the petron.

The crash was sudden and unexpected.

Lights in the trailer went out, replaced quickly by the eerie glow of battery-operated emergency lights which showed through the windows. Vacuum systems, deprived of their pumps, started to wail for attention. Soon a siren atop the building screamed. Petronelli expressed his confusion in Italian. Silverman was more practical.

"We'd better have a look and see what's happened," he said as he led the way out of the trailer. "Is that your control room?"

"Yes. I was just going to check . . . there's Julius. Raphael! Peter! Joe!" Petronelli shook his towering black technician by the arm. "What is it? What's happened?"

"The crane dropped a shielding block."

"Is anyone hurt?"

"No, Dr. Petronelli. We all seem to be OK. Is Dr. Holzman with you?"

"He was going over to the computer when I last talked to him. Let's find out what happened."

The six men rounded the corner of the wall enclosing their intersection region and saw a cluster of people gathering around the giant concrete block which seemed to have fallen just on the other side and at the end of their area. Silverman heard the hiss of Italian escape from Petronelli's lips. He knew the language. Petronelli had said, "The equipment. The equipment. Every piece smashed." The next part was unprintable, then, "It fell from the crane. When I get my hands on that crane operator I will kill him. I will kill him with my bare hands."

Silverman laid a hand on his friend's arm in sympathy, then moved closer to the scene of the damage. A shout arrested their attention.

"Dr. Petronelli! Over here. Holzman's hurt!"

They moved quickly around the giant block, picking their way over the shattered concrete floor. The circle surrounding the injured man parted to let his colleague through. Holzman lay unconscious on the floor, a pair of long-nosed pliers still in his hand, the floor beneath him bloodied from a gash in his head and one leg twisted under him in a discouraging way.

Petronelli went white. "Is he . . . ?"

"No, he's breathing. He must have jumped out of the way just in time. His leg caught on that cable there and I think it's broken. It looks like some concrete from the impact grazed his head."

A laboratory fireman broke into the circle. He took in the situation and called for an ambulance on the walkie-talkie attached to his waist. Then he stared at the broken concrete block.

"How in the hell did that happen?" he asked.

"Just what I'd like to know. Let's see how bad it is," said Petronelli, now over his first shock.

He picked his way slowly again around the fallen shielding block, his face taking on a crumpled appearance, almost like that of a small boy trying not to cry.

His countenance was bleak as he turned to Silverman.

"I guess I will not show you the experiment tonight, my friend. The experiment is no more. The block could not have been better aimed. The wire planes, the counters, all are gone. It is months of work to replace. All we have left is the vat with our small petrons in it."

He moved away to another part of the hall and looked in a corner. This time words, Italian or English, failed him. Then he said, "It is gone. The vat of petrons is gone. They were there when I left for your house. What . . . ? Who . . . ? Why . . . ?"

A second shout cut short his stammering. It came from high under the roof of the giant hall. It was Joe's deep, booming bass.

"Someone come up here quick. I've found the crane operator. He's bound and gagged on the floor of his cab."

Rachel Silverman stirred and woke when her husband climbed into bed in the early hours of the morning.

"You were gone a long time."

"Yes. Go back to sleep. I'll tell you about it at breakfast."

Then she thought she heard Silverman say to himself as she was drifting off again, "All I've got to say is, success sure beats disaster any time."

"Well of course it does," she mumbled into the pillow. "Who ever said anything different?"

Later that same morning in an office in Washington, DC a large, handsome man sat at his desk embroiled in his own problems. Nathan Hunter's jaw was set in an angry line as he glared at the letter which lay in front of him.

Jim Anderson glanced at his friend as he passed Hunter's desk, paused, and put down the steaming cup of coffee he was carrying.

"There are storm warnings along the Potomac today," he announced to no one in particular. Then he turned to Hunter. "And what has caused this look of rage to further darken the SEC's most distinguished legal brow?"

"That!" replied Hunter, slapping a letter on the desk next to where Anderson had settled. "A letter from Addie."

"Your sister . . . in West Virginia? She's always seemed singularly sensible to me. What's she done?"

"Just read it," snapped Hunter.

"OK, OK." Anderson picked up the letter and read: " 'Dear Na-

than, I've been thinking about you and hoping all the snow you've had in Washington . . .' "

"Not that," Hunter interrupted impatiently. "Down where she starts, 'Something out here's been worrying me.' "

"Oh. OK."

" 'Something out here's been worrying me. You know a public health nurse gets to know her patients quite well. Many of mine are so old and lonely that they hardly see another soul but me for weeks. (I guess that's why I'm always so behind. Too much talking and too little medicine.)

" 'Anyway, lately several of these old souls have been trying to sell me *stock*. Now they've hardly enough to eat on, and most have scarcely enough put away for laying out and a decent burial. But they're all convinced that just around the corner lies the pot of gold at the end of the rainbow in the form of dividends from stock in something called Golden Bull Mines. They claim this man on the phone told them that Golden Bull Mines has a big limestone mine near Pittsburgh and has just bought mining rights to a rich vein of copper over in Upper Michigan somewhere. All they need to do's buy stock at a dollar per share from him and they'll double their money within the year. "All we need," he tells them, "is the money to dig up all that rich copper ore. You'll be the owner of a mine this time," he tells them, "instead of a miner sweating his life away like your daddy (or husband, or brother, or you)." And he goes on and on and Nathan, they believe him. They *buy* it. Golden Bull indeed!!! Old miners half dead from black lung, old widows on pension from the mines, and worn-out laborers, some of them your people, Nathan, black people with just enough money to live out their days in peace . . . they give it all to the man on the telephone who promises them the moon.

" 'Since I'm their friend they want me to get in on the bonanza, but I'm worried. It sounds so much like those cases you've told me about, like that man they called "King of the Penny Stocks" that went to jail for selling stocks like this to folks. Please tell me what to do. I'm so afraid innocent people are being hurt. (If I'm wrong, of course, I'll sure wish I'd bought some Golden Bull too.)

Your loving sister,
ADDIE'

"So someone's at it again and right out in your home grounds," Anderson said, putting the letter down on the desk again. "Sounds like particularly heartless boiler room tactics to me, but as long as people fall for them, these guys show up. If they didn't," he shrugged, "you and I'd be out of a job."

"Well, dammit, I'm going to see this guy's caught and put out of

business or . . . what can I do for you, Dee?" He addressed the pert young secretary who was fidgeting just behind Anderson's left shoulder.

"Mr. Rayburn wants to see you, Mr. Hunter. Soon as possible."

"OK, be right in." He turned to his friend again. "I mean it, Jim. I'm going to get that guy." He waved the letter under Anderson's nose and then, ramming it into his coat pocket, marched down the room to the office of the director of the Special Investigations Unit of the Securities and Exchange Commission.

The secretary watched the still bristling football-player's form as Hunter strode away and then looked questioningly at Anderson, still perched on Hunter's desk.

"That's what makes him so good, honey. He gets mad." He picked up his cooling coffee and moved away, adding to himself, "Especially when someone hits that 'your people, black people' nerve. His sister sure knows him all right."

Stanley Rayburn was looking over the morning's pink sheets, a thick, two-hundred-page bundle of mimeographed forms containing the over-the-counter stock prices in the eastern part of the United States. He had the absorbed air of a man reading a good novel, and for him the pink sheets or a strip of ticker tape unfolded tales far more fascinating and revealing of man's nature than anything fiction could provide. "Brilliance, self-destruction, greed, even innocence . . . they're all there, Nathan, in that mass of numbers and letters. Just keep your characters straight and watch for motive. It's the best soap opera in the world," he'd told Hunter when he'd come to the SEC fresh from law school. Now he frowned and motioned Hunter to the chair next to his desk, laying the pink sheets on top of the green sheets from Chicago, and the white sheets from San Francisco.

"Paper, paper, paper," Hunter thought to himself, "and still little old ladies in West Virginia get fleeced." He gave an irritable mental shrug and tried to listen to his boss.

"Nathan, I've got a request for help I want you to handle. It'll mean a trip to New York for some work with the regional office's market surveillance crew, and if the indicators are right, to the Cleveland branch office."

Hunter nodded wordlessly.

"Market surveillance in New York has been noting an unusual activity in over-the-counter sales of power company stocks. Of course these are always viable, particularly in an unstable market, but one of the investigators in New York did a spot-check on some class B voting stock for Gateway Electric, which serves a large share of Pennsylvania west of Harrisburg and a good bit of West Virginia. He did

some really tough digging and found that the stocks went to an investment house in Cleveland which was buying for an agent of a businessman in Casablanca. It's a hard track to follow from there, but they seemed to pass from there to Lebanon. Now they don't call Lebanon the Switzerland of the Middle East for nothing. The banks in Beirut allow numbered, "Swiss-type" accounts and if control stock in a good-sized utility like that is passing into Lebanese hands, I find that damned interesting. So does the New York office.

"So this investigator, Henry Bauer's his name . . . new man . . . know him?"

"I think I met him on my last trip, but only briefly."

"Yes. Well anyway, Bauer got interested too and decided to keep an eye on things. He noticed activity in Indio-Electric—purchases of blocks early in the day . . . quiet . . . no attempt to drive the price up . . . just good steady buying. Don't know what sixth sense prompted him, but he dug into that one too. The stock was being bought by a broker in Indianapolis and a bank in Dayton but ended up in the hands of this same financier in Casablanca.

"Of course there may be nothing in this for us. The stocks have been properly registered and there doesn't seem to be price manipulation going on, but you know some pretty shady characters have used those Swiss-type accounts to get around us and the boys at Internal Revenue. I'd hate to wake up and find the Mafia in charge of all the electricity in the Middle West, for instance. The funny thing is, though, that these are old, staid companies . . . fusty, even. They're in need of new generating equipment and management with imagination. Their main assets are their distribution equipment . . ." His voice trailed off a bit as he pondered the problem. Then it brightened again.

"Now this Bauer is a good man, or will be when he dries behind the ears. But he's just fresh out of school and he's not just sure where to go from here. He may have himself the tip of an iceberg and not know what to do with it. His boss, Willbrandt, remembered you from that job you did clearing up the raid on the FoldGold Paper Company and he's asked for you again."

"How soon does he need me?"

"Can you catch the first Metroliner trip in the morning?"

"Yes," Hunter answered and then seemed to hesitate.

"Something the matter?"

"Well, while I'm over in Cleveland, I'd like to look into some over-the-counter deals going on around the West Virginia area. They sound like typical penny-ante swindling to me. Here's the tip on it."

He handed Rayburn his sister's

letter, and pointed to a spot halfway down on the first page.

"It starts here."

Rayburn read in silence, shaking his head slowly from side to side.

"Why do they keep falling for it? You'd think by now . . ."

"A lot of those people come from families where they're not used to money," Nathan said, feeling the anger rise again. "I'll look into it, then?"

"Yes. You'll need help. Get someone in Cleveland to give you a hand and see what the local people in West Virginia and Pennsylvania have on it. Maybe Anderson can give you a hand when he wraps up what he's on now. Meanwhile, New York's waiting. Give my regards to Wall Street."

Hunter smiled. How many times had Rayburn sent him off with that one joke of his. As he left the office, however, he thought to himself, "Casablanca? Beirut? Numbered accounts?" He sighed. "Somebody up there hates me."

And then he smiled again. It would be a tough case, but interesting. Very interesting. And it would put him in the right place to track down Mr. Golden Bullshit himself.

Nathan Hunter sat down at his desk to call his wife and have her get his bags ready and then began to clear his desk of paperwork so he could leave for New York with a clear conscience.

The Riverside Bank and Trust of Huntington, West Virginia bought a block of shares in Indio-Electric for a Mr. Holloway who sold them to a Casablanca firm which was really an agent for a banker in Beirut.

Mario Petronelli visited Fredrick Holzman in a Long Island hospital where the physicist was being treated for a concussion and a badly broken leg. "That man Silverman's in some sort of government agency," he told his friend. "He says he knows a man who can find out how it all happened and why. He's calling him in on it today."

And Dr. D. A. Silverman, head of Science Processing, Inc. landed at O'Hare airport in Chicago where he caught a suburban limousine to an attractive apartment complex in the little town of Lisle west of the city. He entered one of the modern, low-slung buildings spaced out around the wandering man-made lakes which had begun their existence as quarry pits. In the little foyer of the building he searched the names on the mail boxes and found the one he sought.

Dr. John Leigh.

For some the day was just beginning but for John Leigh it was now drawing to a close. Since ten o'clock the night before he had been setting up the complicated equipment he and his fellow experimenters had designed and built at the laboratory in Batavia, out-

side of Chicago. The placement and adjustment of the target had been a delicate and skillful piece of work, and Leigh was pleased. It had gone well.

He was thoroughly enjoying his return to physics. The excitement of searching the world of the infinitesimally small for the tiniest building blocks of nature more than made up for the more obvious thrills of his work for Science Processing, Inc.

After all, he was a physicist. A youthful desire for some swashbuckling adventure had led him to work for Silverman right out of graduate school. Dr. Allen, his adviser, had told him about Silverman. He was, Allen had said, a former colleague who was now with the government, and was recruiting "young men who are physically fit, have advanced technical training, and find most ordinary jobs, shall we say, unexciting." Allen had neglected to mention that these young men would also need more than their share of nerve and incredible dumb luck to survive their work with Science Processing, Inc. It had been interesting work, no doubt of that. But assignments in Korea, Europe and the Middle East had satisfied his urge toward the dramatic long ago. He was even letting his Russian get rusty.

His physics, on the other hand, was getting sharper each day. It had taken some studying to catch up, but now he had a good grasp of the experiment and the supersized accelerator he'd been using to do it on.

At the moment, though, he was dog-tired. Twelve hours of mental gymnastics plus manhandling the heavy equipment around was enough for one day. The chic rustic wooden stairs to his apartment creaked pleasantly as he climbed them. The key seemed heavy in his tired hands. He pushed open the door and stopped dead, sniffing the air. Only one man he knew used that pipe tobacco. He even knew the little shop in Manhattan where it was custom-blended.

"Good morning, John. The charming young lady across the hall said that you'd be back soon and suggested that I wait here. She, ah, seemed to have a key." Silverman sat back in the easy chair and puffed on his pipe, smiling benignly through the smoke at the younger man.

"Uh, yes. Well . . . She sometimes lets repairmen in and things like that. Very handy. Has odd hours. Stewardess, you know, and . . ." He realized he sounded like a kid caught necking behind the gym. Silverman was not enough older to be his father but too much his senior to be his equal. Somehow having him meet Felicia like that embarrassed Leigh. "Though," he thought, "Lord knows I'm of age."

He gave himself a mental shake

to get his tired brain working. The only thoughts he could muster about Silverman at the moment were distinctly uncharitable. Dammit! He liked being back in physics. And Silverman hadn't flown all the way from New York to check on his morals.

Coffee! That's what he needed.

"Well, this is a surprise," Leigh recovered. "It's too early for a drink, I guess. Can I offer you some coffee?"

"The young lady has already graciously prepared me some," Silverman replied, gesturing to a cup Leigh hadn't noticed on the chairside table. "I think there's a potful in the kitchen. It should still be hot."

Leigh went into the minikitchen and poured himself a cup. His boyish face under the thick, black hair was puzzled and angry. After his last adventure* he had had enough. He could sometimes still hear in his sleep the dehumanized voice of the other-worldly computer challenge him, still feel the tingle of the liquid nitrogen on the soles of his feet as the machine had tried to freeze him alive. Even now he shuddered at the memory. He picked up the cup and carried it to a chair on the other side of the log fire he now noticed burning comfortably on the raised hearth.

"How's it going, John?" Silverman asked when Leigh was seated.

"Not bad, Professor. The targets are working fine. The accelerator's giving a good, steady beam. I think we'll be able to make a successful measurement."

"How about the target density? To approach the precision you people are shooting for you're going to have to hold it mighty tight."

As usual, Leigh was surprised at the scope of Silverman's feeling for what was going on in physics. His answer was fairly technical and ten minutes later Leigh still hadn't a clue as to why his former boss had invaded his apartment on this cold January day. Then he detected a subtle change in Silverman's eyes. Their blue changed abruptly to a steely glint.

"So you've learned a lot this last year. Good! You'll need it."

"Of course I will. It's a complicated experiment."

"I'm afraid that's not what I meant. Someone else will have to take your place in that group, John. We have to ask you to come back on the active list."

"Like hell!" Leigh blurted out. Then he recovered himself. "I can't come," he explained. "I'm a physicist and I'm doing physics. I *like* doing physics. You'll have to get someone else."

Silverman shook his head. "There is no one else—at least no one else with your training and expertise. This is no job for some in-

**The Siren Stars,* Analog, March, April, May, 1970.

experienced kid. I'm not even sure how to handle it."

"Then it won't get done," John answered brutally. "Look, Professor, I've been working my tail off since ten o'clock last night and I'm dog-tired, but I'm satisfied with what I've done. It's good physics and I want to see it concluded, with my name on the paper that gets written about it. Life's good here"—his eyes strayed to the door where just across the hall Felicia was getting ready for a trip somewhere, and when she came back—"and I want to stay and enjoy it."

"You say you're a physicist. So are Mario Petronelli and Fredrick Holzman. Holzman's in a Long Island hospital today and lucky to be there instead of in a mortuary. And their experiment's smashed to bits by some unknown saboteur. Now somebody's got to see that that sort of thing doesn't go unchecked or nobody, including you, will be able to do any physics at all."

"Petronelli? Holzman? Yes, I knew they were setting up some far-out experiment, and that it looked as if it was going pretty well."

"It was until it was destroyed."

"But what happened?" Leigh realized too late that he had just put a foot flat into Silverman's web.

"That's just it, John. We don't know. We don't even know exactly why what happened, happened, or what to do about it. But we do know that it's a job for Science Processing and, we think, for you especially. Here's the problem . . ."

Silverman quickly and accurately described the destruction of the Petronelli experiment and the disappearance of the vat of petrons, concluding with the discovery of the bound and gagged crane operator.

"So it was really sabotage." Leigh leaned forward in his chair. "But why? And by whom?"

The older man also leaned forward intently. "No one knows. There was just one clue. This. It was found near the crane operator."

He handed Leigh a small medallion shaped like a convex lens, perfectly round. On one side was the raised image of a double-headed ax. On the other, a stylized head of a bull. Around each image was strange writing that appeared to be incised with some sort of stylus. The object glowed dully in Leigh's hand.

"That's almost solid gold," Silverman remarked.

"But what is it? Some sort of archeological artifact, it looks like."

"The archeologist we consulted said it was modern. The symbols, however, are traditional symbols of the Minoan culture of Crete in about 1500 BC. The script is a version of the ancient palace script of the Minoan Palace culture called Linear B. This Linear B has only recently been discovered to be an early form of Greek."

"It's beautiful," Leigh said, holding the object up by its rawhide cord and then, as he remembered its significance to him, handed it back to Silverman as if it were suddenly hot. "But what the hell does it have to do with the destruction of a Twentieth Century physics experiment? And what the hell are petrons anyway? And why steal them, almost kill for them? And why," he concluded, "should it involve me?"

Silverman chuckled. "One question at a time. First—about petrons. They are in a class of elementary particles like quarks or magnetic monopoles."

"Quarks! Monopoles! That's mostly crackpot stuff! You can't separate a magnet into a north-only or south-only pole any more than you can separate one side of a coin from the other. Magnetic monopoles!" he huffed.

"Yes. But not everyone's satisfied with three-hundred-year-old theory. They've worried that theory like a dog worries a bone—Dirac in the '30s and then widening interest as the big machines got built and put into operation. What, for instance, would Gilbert have thought about that monstrous machine you're working on right now in Batavia?

"Anyway, Petronelli saw that the time had come for some long-shot experimenting, grabbed the ball, and ran with it. He and that genius friend of his . . . Holzman, I mean . . . got time on the BNL storage rings and went and produced a single-poled particle, then several. Even more surprising, the particles were so stable that they could be stored just like money in the bank. And, just like money in the bank, they got stolen and the only equipment capable of making them was destroyed."

"But that's the puzzler, Professor. Why sabotage? It's so rare on such a scale. I can think of several reasons, of course."

Leigh ticked them off on his finger.

"There's always the possibility of a demented rival. But even physicists, big-headed as they are, don't go that far. Or then there's a foreign agency which has recognized some defense use for the discovery. Perhaps the culprit is some industrial saboteur interested in preventing some technical advance or other. Do any of those fit?"

Silverman nodded, smiling inwardly as he saw that his trip to Chicago would not be in vain.

"It could be either of the last two," he replied. "I've questioned Petronelli very closely about defense or industrial applications. He was so engrossed in the excitement of discovery that he hadn't even explored possible applications of the petron to industry or defense. The destruction of the experiment and the near loss of Holzman shocked him into looking at applications which might precipitate the outrage.

"He came up with two possibilities, either of which could have some interest. First was that petrons would be easier to accelerate than protons. All you'd need would be a long magnetic solenoid. The accelerated petrons could be used to produce more petrons. (Production in the storage rings had been very slow. Petronelli's group had only produced four or five in the couple of months they'd been getting them.) Petronelli, of course, not looking for an application, had simply stored his in a small vat of oil in the back of the experiment."

"And that was stolen?" Leigh interrupted.

"Yes. After the excitement died down, someone remembered the vat being carried out on a fork-lift truck just before the crash. The fellow looked as if he knew what he was doing, so no one stopped him."

"So the monopoles or petrons or whatever they're called can be used to produce other petrons something like neutrons in a chain reaction. I'm still not sure that makes it worth all that trouble unless they're good for something once you've got a lot of them," mused Leigh.

"That's what Petronelli thinks too. He says you might use the north-only–south-only property by recombining a north pole with a south pole. That would release tremendous amounts of energy, of course."

"Why, you're talking about an antimatter bomb! Now that . . ."

Silverman shrugged. "It's such a remote possibility. But still there was that exotic character and there was this." He leaned over and picked up the gold medallion Leigh had laid on the small coffee table and looked at it thoughtfully.

"Exotic character? What exotic character?" Leigh asked.

"Didn't I mention the dark man with the eyes that didn't quite match? He was a small fellow, dark hair . . . had on a black, pin-striped suit . . . stopped us to congratulate Petronelli when we were on our way to the experiment. He seemed to be the only man around there Petronelli didn't know." Silverman turned the medallion over and over again in his hand.

"What do you mean, 'His eyes didn't quite match'?" Leigh asked him, puzzled.

"Oh! Well, one was blue and the other brown. Now why did seeing this again make me think of him?" He looked at the medallion intently. "Now I remember. It was his lapel. The double-headed ax. He had one in his lapel. Gold . . . like this."

"So I'm to find an exotic-looking guy in a black, pin-striped suit with a gold, double-headed ax in his lapel carrying a vat of petrons on a fork-lift truck. Why didn't you say so? Nothing to it. I can get that done before the experiment here goes on the air," Leigh said sarcastically.

"Don't be facetious, John," Silverman answered seriously. "The dark man is connected with it all some way, I'm sure, but I have a feeling this is going to be an incredibly complicated affair.

"You'll have two weeks to get out of the experiment here and then you're to go to the New York meeting of the American Physical Society. There you are to put yourself on the job market. I figure whoever has got those petrons will want to build a machine, maybe some sort of a linac or large solenoid, so they can produce more. Unless they already have a staff, they'll be needing a physicist to help them build it. You'll be given a cover background in engineering physics with glowing recommendations. A beard would help alter your appearance. Ever grow one?" Silverman asked.

"Never on purpose," Leigh replied, remembering a long, shaveless assignment in Korea.

"Well, you've got two weeks. Round off your work here and get ready for New York. I'm sure that's the next stage for this drama we're watching."

Silverman rose. "Thanks for the coffee, John. I have to see an old friend or two in Chicago at the University. Petronelli will be sending you a report on everything he knows about the petron, which is plenty. Give you something to do in your spare time.

"Say good-bye for me to the charming girl across the hall. She makes an excellent cup of coffee. I'll get back to you later." And with that he was gone as surprisingly as he had come.

"But . . ."

Leigh stared at the door after it had closed on his unwelcome guest. He was too tired and confused to think. Suddenly the door opened again and Felicia's autumn-leaf blonde head appeared.

"Hello, love. Did your friend get hold of you?" she asked brightly.

"He sure did," Leigh answered wearily. "He sure did. Want some coffee?" he added, more out of courtesy than desire.

"Haven't the time now, love. I'm due at O'Hare in one short hour and then I'm off to Toronto. But I'll be back," she said, putting rich promise in the words. "Bye now."

Felicia blew him a kiss and the door closed again. He listened to her heels on the wooden stairs. Then the room was silent. Leigh looked affectionately at the pretty view of the man-made lake outside his balcony window. A flock of ducks was paddling constantly to keep a small hole in the ice from freezing over. On the other edge of the pond a pair of skaters were cutting figure 8's.

Monopoles . . . petrons . . . double-headed axes . . . pinstripes . . . engineering physics . . . smashed equipment . . . stolen vats. He knew his mind was wandering. He'd sort it all out later.

Without even removing his grimy work clothes he kicked off his shoes and fell wearily on the bed. In less than a minute he was asleep.

And while he slept, Maria Lincoln in Tophoe, West Virginia bought a hundred shares of Golden Bull Mining stock from a persuasive man on the phone. She'd have bought more, but a hundred dollars was all she had.

John Leigh liked going to meetings of the American Physical Society. He looked around him as the taxi wove through the tangled Manhattan traffic. New York seemed the same as he had left it. A little dirtier, but the same. He remembered his last New York APS meeting—how he'd enjoyed being exactly what he seemed to be, a skilled physicist making a genuine contribution to his profession. And that, he thought sourly, was just the string Silverman had used to pull him back into the web of Science Processing—physics had been threatened by some weird character who was going around destroying experiments and nearly murdering physicists. How was the field to function when this sort of thing went unpunished? How many physicists had the training and experience to seek out and expose such threats? Only you, John Leigh. That was Silverman's story and he'd stuck to it.

"And now here I am," Leigh thought morosely, "off on another one of his harebrained schemes. I hope I can remember what a Collins straight section is and all that stuff on separated-function magnets. Hell, my head feels like it's going to drop off with all the design material Silverman's had me cram into it these last two weeks." He stared out the taxi window at the gray wintery cityscape and tried to remember all the accelerator theory he'd been reviewing on the plane. The taxi slammed to a halt under the portico of the Hilton and the harsh Flatbush accent of the driver brought him out of his concentration.

Leigh paid him, and briefcase in one hand, overnight bag in the other, strode into the lower lobby of the New York Hilton to attend the mid-winter meeting of the American Physical Society.

He took the escalator up to the second floor lobby of the hotel, where it was the usual mob scene common to meetings of this size and scope. The long mezzanine was set with tables for registration. On the window side, their backs to the avenue, harried ladies of an assortment of ages frantically typed registration forms. On the other side of the tables disorderly lines of men waited their turns to register, falling out of line now and again in order to hail an old friend disgorged by the escalators onto the already crowded floor.

The variety of styles of dress and

manner proclaimed to the casual observer that this was not likely a meeting of IBM salesmen. Sports coats, open-necked shirts, long, long hair, no hair at all, long beards, goatees, an occasional beads-and-headband type, a sort of United Nations of complexions and accents—a black Ghanian chatting with a tow-headed Swede, British accents, German, Italian, Greek, Chinese were all talking at once in their common language—physics.

Each man had tucked into his suitcoat pocket a projecting card which carried his name and that of his institution. (Leigh always wondered what the women—and there were more of them this year—did with theirs.) Every participant carried with him the green-paper-covered program of the meeting and referred frequently to it or to the shortened version printed on the bottom of their name cards as plans were prepared for meetings, both formal and informal.

The motif was contact. Everyone seemed to know someone else. Conversations were intense. Small notebooks were out. Reports and programs were marked on, formulae, notations, dates and addresses were scribbled in the margins and on the backs, reflecting the frustration of those who have lived their lives around blackboards and suddenly find themselves without chalk handy.

Leigh fell into a scraggly line presided over by a motherly-looking woman who also looked efficient. He scanned the lobby for familiar faces and caught sight of the director of the lab he had just left. Off in the distance he saw several former professors and waved. It was a little like a Homecoming weekend.

There was a stir by the nearest escalator and a small, handsome Italian with salt-and-pepper gray hair and the air of a dandy stepped off.

"Hey, Mario!"

"There's Petronelli."

"Over here, Mario."

Leigh looked more closely. So this was the man who had fathomed the secret of the single magnetic pole. What a grasp he must have to be able to produce the stack of paper Silverman had sent him in the preceding weeks. Leigh was impressed.

"I hear there was an accident on Petronelli's experiment," the man behind Leigh remarked to his companion.

"Yeah. Some damn fool of a crane operator dropped a concrete block on it. Nearly got Fred Holzman."

"That would have been a loss, particularly for Petronelli. He's not all that much without Holzman's talent," the other said cattily.

"Oh, I don't know, Lou. Petronelli's got insight. Holzman's a damn good equipment man but without Petronelli's physical intuition . . ."

It was an old argument—insight versus technique. Leigh found it a bore. He didn't believe any physics could get done without a balance of both.

"Yes, sir?" The gray-haired lady spoke and he realized he had moved to the front of the line.

Leigh got himself registered and tucked his name card into his pocket. "Where is the job placement center this year?" he asked the lady.

"Over at the Park Sheraton," she answered.

Leigh thanked her and moved off through the crowd. The magnitude of the importance to physicists of Petronelli's work showed in the snatches of conversation he overheard as he made his way to the bank of elevators serving his room.

". . . fantastic piece of work. I never was a believer, but now . . ."

"Going to hear Petronelli's post-deadline paper? Hear he's got some real news . . ."

The only other topic of conversation more prevalent was about the job market.

"Dr. Howard! Good to see you. Hear you're looking for a research assistant . . ."

"God! I just found out that Tech's not hiring a soul this year. Funds cut, I guess. My contract's up in June and I'd counted on Hansen to get me something in his group. You don't know anyone who's looking for a theoretician. . . ?"

"Boy! I really feel sorry for these young graduates. I've got one slot to fill and over a hundred applicants. Things sure have changed since I got out of graduate school."

"Well, I'm off to the cattle market tomorrow. I've got five interviews . . ."

"You're lucky you could find five . . ."

Leigh sighed. "The cattle market, is it? And I'm in it. Should be a new experience," he thought to himself as he stepped on the elevator and was whisked up to his floor. "Well, if I'm to be one of the cattle, I'd better fatten myself up."

And he showered, stared at his beard to see how it was coming along, and returned to the lobby to see whom he could find to go out to dinner with.

The next morning, a Monday, was the first official day of the meeting and the opening of the job placement center. The center was on the second floor of the hotel and occupied almost the whole floor. At the head of the wide stair leading up to the long lobby a line of secretaries sat at tables making appointments for interviews. Leigh climbed the ornate staircase, moved over to the secretaries' table and picked up the list of job offerings.

Never having been "on the market" before, he didn't know how much thinner the stack was than in the heyday of physics hiring. He half-seated himself against the

table and read the list carefully, wishing some magic would turn what he was looking for into colored, flashing lights. Instead it was all dull type. Job descriptions, fringe benefits, salary ranges, requirements. There was not all that much to choose. He picked out what he thought would be a nice random number of possibilities and started filling up his days with appointments.

Most of the interviews were, as Leigh had expected, unproductive. The interviews were held in conference rooms leading off of the main lobby. Privacy was at a premium in the crowded rooms. If the applicant was really interesting to the recruiter, the two parties often arranged a second meeting in a quieter spot somewhere else.

By Tuesday night, Leigh, with his impressive dossier, had been offered the expectation of good yachting if he accepted a job in Southern California, self-fulfillment (at a low salary) and excellent skiing at a small school in Vermont which was expecting to get a grant for a three MeV linac, and an enormous salary at a magnet manufacturer's in Milwaukee. They were all standard, legitimate offers as far as he could see.

When he wasn't interviewing, he'd gone to accelerator meetings and wandered about the lobbies, keeping his ears and eyes open for small, dark men in pin-striped suits. He did see, in the crowd at Petronelli's lecture about the finding of the petron, several short, dark men—one Indian from New Delhi, four Arabs, and a couple of Spaniards. He found himself trying to sidle up to them to look at their eyes and buttonholes. The Indian, in fact, had noticed and been definitely annoyed.

"Damn!" Leigh muttered to himself. "Silverman's finally done it. He's driven me nuts. I always thought it would happen. Too bad he didn't set me on the trail of a small, dark woman. That one over there talking to Allen would do nicely." He glanced across the room at an elegant, dark-skinned beauty in a ruby-colored wool suit talking to the former head of the department where he had gone to school. He wasn't the only man in the room trying to think up a reason to see his old friend Allen again.

"To hell with it!" he decided. "I'm going to give up and get something to eat."

Leigh's mood hadn't improved much by Wednesday morning. Some people were already beginning to check out. There would be the usual banquet with the usual awards and speeches and the usual chicken, peas, tossed salad, and Baked Alaska with ice cream hard enough to break a tooth on. And tomorrow he'd go back to Illinois as a lame duck, his mission a failure without ever having begun. He

realized now how completely Silverman had gotten him entangled. He wanted to get the job done.

His last interview was with a small food-processing company. The job description had said, "Growing food-processor in western Pennsylvania desires to hire experienced physicist to aid in design and construction of a small accelerator for use in highly specialized food processing technique. Salary open."

It at least sounded different so he'd signed up. An interviewer for General Electric was off in a corner of the large room with a young post-doc, the murmur of their voices just barely audible. The rest of the chairs and tables were empty save for a woman seated as far away from the GE interview as possible. Leigh went hesitatingly up to her, and suddenly recognized her as the small, dark woman in the red suit who had fascinated so many of the men at Petronelli's lecture.

She flashed a glance at him and then looked demurely at the desk. "Dr. Leigh? I believe we have an interview scheduled."

"Dr. Pandarou? Westpenn Foods? Yes, I believe we do."

Her eyes still lowered, she motioned Leigh to a chair. "One moment please." She had before her a Xerox copy of Leigh's dossier and continued to study it quietly while Leigh in turn studied her. She was not tall, he knew from the other night, probably not over five feet. Her skin was dark and smooth with lustrous, black hair hanging straight down her back in one enormous long braid. The brows over the lowered eyes were dark and arched. The cheekbones high and prominent. The nose a trifle too long but narrow and straight. Her mouth was drawn in concentration.

It was one of those long moments when he wished he still smoked so he'd know what to do with his hands.

Finally she laid down the papers and looked up.

"Now then, Dr. Leigh," she began briskly, "you have quite an impressive set of credentials."

"Uh . . . yes . . . well . . ."

Her direct, beautiful glance had left him completely at a loss for words. He stared for a moment, trying to remember his carefully memorized background. No wonder all the men were crowding around her yesterday at Petronelli's lecture. She was waiting for him to speak, he realized.

"Yes," he cleared his throat to cover his confusion. "I've been around the accelerator field a good bit. I'm not as familiar with its application to food-processing as I'd like to be, however. What sort of an accelerator do you plan to build and how will it be used?"

The woman lowered her eyes again, a charming habit she seemed to have which made her seem extremely feminine. Its effect was the

same as turning off the lights in a room. She spoke again.

"Actually there are quite large possibilities to use accelerators to irradiate food for preservation. Our application, however, is not so much with preservation as with growing a food, a very special luxury food—the morel mushroom.

"The morel, as you may know, is the most delicately-flavored of the mushrooms, but so far has not been able to be grown for profit. My employer has succeeded in creating an environment where the morel grows enough to make a profit. It involves a special compost of oak leaves such as the morel loves, but this compost must be irradiated to kill any other organisms before the morel spawn can be introduced. We have irradiated some of the compost at a university accelerator near Pittsburgh, and in fact have purchased a small linac for our work. But now the operation outgrows this machine and my employer desires to design and build a new one. With this machine we hope to be able to sterilize commercial quantities of compost. It says here that you are qualified to help us with this project." She tapped the dossier with a slender finger. "What would you say, for instance, was a good cavity configuration for a practical linac like this?"

Her questioning was searching and rapid. He noticed that when the conversation got technical, the demureness of Pandarou's character diminished and she became sharp and a little intimidating. He found he had to concentrate to keep the now direct gaze of those beautiful eyes from distracting him, but he acquitted himself well. When he really didn't know the answer to one of her searching questions, however, he admitted it. After only a few minutes he knew that it would be useless to bluff this very good physicist sitting across from him.

After almost an hour of intensive questioning, Dr. Pandarou stirred in her seat.

"I think I understand your qualifications now, Dr. Leigh. Have you questions for us?"

"Yes. Mushrooms and accelerators. I admit that I find the combination a little exotic."

The woman extracted a photographic album from her briefcase and laid it in front of him.

"And so it might seem," she answered. "Perhaps these pictures might help to explain.

"The mushroom farm," she continued, "is in an old limestone mine which my employer's family owned. When the mine became unprofitable, he searched for a new use of the property. There was already some mushroom farming going on in other abandoned mines in the area, and this possibility presented itself. It is clever, is it not?"

Leigh stared at the pictures of row upon row of trays of compost

covered with the long, narrow, latticed heads of the morels. The workers tending them had on miners' hats, the lights of which picked out the white of the mushrooms against the dark of the mine.

"Clever? It's fantastic! Your boss must be a pretty smart guy."

The woman smiled. "Very smart." She began gathering up her papers. "I think we should talk further if you are interested, but now"—she glanced at her watch—"I have another appointment. Have you more questions before I leave?"

"Yes. Will you have dinner with me tonight? We could talk then."

"A bit out of the ordinary for the applicant to suggest taking the interviewer to dinner, don't you think?"

He couldn't tell if she was angry or not.

"This interviewer is quite out of the ordinary to begin with," Leigh answered, his gray eyes smiling.

The woman lowered her eyes, the demureness returning. She hesitated and then spoke. "As you wish," she said. "I shall meet you at seven in the Hilton lobby where formerly were the registration desks. Till then . . ."

She nodded her head slightly in farewell and was gone from the room. Leigh's smile broadened into a grin as he rose and strode out into the hall. "Now all I have to do is get rid of this banquet ticket," he thought happily to himself.

He grinned again at his reflection as, at 6:45 that night, he was knotting his favorite tie. He tried once more to brush the thick, errant black hair into place and pondered his luck. Unattached women are hard to find at Physical Society meetings, let alone one as spectacular as Dr. Pandarou. Bachelors usually made do with the few secretaries or unmarried women physicists or the surrogate companionship of the married couples who included them in their dinner plans.

When he saw her in the lobby, he felt even luckier that it was he who would claim her from the cluster of men surrounding her. She had on a long dress of heavy silk printed in a paisley design of deep purple, black, and gold. A purple wool cape lined in the same fabric as the dress was flung across a nearby chair. Her dark hair was intricately woven into a crown on top of her head and a delicate pin of gold wire shaped into the form of a stylized wasp was clipped at the V of her very low décolletage.

She smiled at his approach and handed him the cape which he placed on her shoulders. Then they went down the escalators to the main floor.

"Where would you like to go? Noisy or quiet? Italian? Barcelona Spain? Mandarin Chinese?" Leigh asked.

"I prefer quiet for eating," she answered. "There is a very quiet place in the Village which a coun-

tryman of mine owns. But perhaps you do not like the cuisine of Morocco?"

"I'm not familiar with it, I'm afraid. But I'd like very much to learn."

Leigh had the doorman secure them a taxi and soon they were on their way downtown.

"So you are North African," Leigh remarked when they were on their way. "I had a bet with myself whether it would be Greece, Turkey, or Egypt. I didn't think of Morocco."

"My people have lived in Morocco for many generations, but we are not North Africans."

"Oh?"

"Yes. Legend has it that we came many centuries ago from the Isle of Crete. A holocaust destroyed our home and we were forced to flee. The ships we sailed in came to the North African coast, and we found homes there. There are groups of us in Lebanon, Ethiopia, and Morocco. We were the scholars and scribes of Crete and generally my people have found employment as such ever since."

"So you come by your scholarly talents naturally. Did you get your schooling in Morocco?"

"My dear Dr. Leigh, when I was a student, the women of Morocco had just discarded their *haiak*. This robe, which covered them completely but for the eyes, covered their brains as well. Though I am not a Moslem, ninety-eight out of every one hundred Moroccans follow Allah. Needless to say, the opportunities for a girl to become a physicist in my country were limited, if not nonexistent. But because women are the equals of men in my religion, our sect saw to it that I had an opportunity to travel to Paris when I showed promise as a student. I am a product of the Sorbonne and of Cambridge."

"I see. And have you been here in America long?"

"Six years. I was at Harvard when Mr. Tauroman, my present employer, contacted me. He had done business in past years with members of my family. His offer was interesting and he pays well. I have been with him about a year."

"I still find it surprising that a physicist of your caliber should be working at a little mushroom farm in Pennsylvania."

The woman smiled suddenly as if he had said something which amused her immensely but didn't understand the joke himself.

"We're not so small as you might guess. The morel farm is, perhaps, a gold mine. But my employer is a man of many talents and ideas. There is much work—exciting work for a physicist in his employ, as you shall find out should you enter into a contract with him. I have, by the way, spoken with him this afternoon. If you are interested, I am authorized to make you an offer."

Leigh remained outwardly detached.

"I suppose that it depends on the salary."

The woman named a figure that in the tight job market was quite staggering.

"I think," Leigh understated, "that will be quite satisfactory. When do I start?"

"We are embarking upon what might be called a 'crash program.' We will expect you to wind up your present commitment and report to us one week from Monday."

"A week from Monday. Isn't that a little. . . ?"

Her voice hardened slightly as she interrupted him.

"The salary, as you may have noticed, Dr. Leigh, is excellent. For that salary my employer expects a great deal—extreme dedication to his interests, complete discretion as to the special processes he is developing, and a timetable of his own making. Not the least of your qualifications was the fact that you are a bachelor and therefore more free to move quickly than is a family man. The job starts one week from Monday if you wish to accept it."

"I'll be there."

The woman softened again.

"And here we are," she said gently as the cab pulled up to the address she had told him to give the driver.

Leigh looked out in surprise. They were opposite what appeared to be one of the loudest, brightest discotheques he had ever seen. Psychedelic lights flashed and blinked turning even the street into an hallucinating experience. In two large bay windows two go-go girls gyrated wildly to the pulsating hard rock that seeped out of the closed door and windows and seemed to make the very sidewalk vibrate. The music poured out into the night whenever anyone arrived or left the place. A flashing, multicolored neon sign proclaimed the place as *Thursdays Are Red.*

"Quiet?" Leigh asked his companion. "This is quiet?"

The woman laughed. "Oh, this is not the place. I gave this address because of the maze of one-way streets down here. Come. I will show you the way."

She slipped her arm through his and while seeming to follow him, gently guided him around the corner into a narrow, brick-paved street that twisted darkly into the night. Halfway down the block was a small, discreet sign in Arabic with, below it, the English translation, "The Medina."

The restaurant was on the second floor of the old building, but the climb up one flight of stairs took Leigh and his companion several thousands of miles away from the chilly streets of Greenwich Village.

At the top of the stairs stood an intricately-carved screen of cedar around which they passed into a large room full of the fragrance of roasting meat, mint, and spices. The plaster of the walls was also

carved into fantastic woven patterns and above, beams of cedar inlaid with mother-of-pearl glowed in the dim light.

A long counter along one wall housed a charcoal brazier on which skewers of meat sizzled in their peppery bastings. In another corner, a cook was deftly rolling balls of meat paste into small hoops and slipping them into hot fat, stringing the finished products onto strips of raffia when they were done. Seated on a rug-covered dias was a young man playing what looked to Leigh like a variety of lute. It was, he found out, an Arabian stringed instrument called an *oud,* and was very pleasant to listen to.

Diners, speaking Arabic, French, or pure New York City English were seated on divans or on pillows around low tables. In front of them were bowls of yogurt, or dishes of chicken garnished with apples, olives, and carrots, and plates of the Arabian version of pasta—*cous cous.* The proprietor obviously knew Dr. Pandarou and greeted her in Moroccan-Arabic dialect.

"*La bes,* Dr. Pandarou."

"Hello, Ahmed," she answered. "My friend wishes to learn of Morocco's food. You shall teach well, I know."

"But of course, Doctor. It will give me the greatest pleasure to serve you and the distinguished gentleman. This way, please."

The restaurant was crowded but still had the cozy, personal air of the as-yet-undiscovered. Leigh wondered when some food columnist would find his way here and bring fame, prosperity, and the temptation to lower the quality and escalate the prices.

They were seated in a corner at a low table like the rest. The food did, in fact, prove to be excellent. Leigh made only one mistake during the meal. Served with the chicken *cous cous* were two sauces, one red and one clear and watery. The red looked poisonously hot. His main experience with peppery food was in New Mexico where he had enjoyed the cooking. But somewhere he had heard that North African food was even hotter than New Mexican and that red sauce looked like something right out of Juarez. So he settled for the innocuous-looking clear sauce and found to his dismay that he had put pure essence of pimento on his dinner.

His eyes had stopped watering by the time the honey and almond pastries had arrived, and a cool, fresh orange soothed his burning throat. His companion politely refused to notice his agony, but he thought he detected a small smile hidden behind her glass as she sipped her coffee-laced hot milk.

The pace of the meal was leisurely and his companion was charming. Soon they had relaxed with each other and were using first names. Hers, he found, was Daydala.

"Do you get homesick when you come here?" he asked her. "It seems so different from the world just outside."

"Yes, I enjoy my visits to this place," Daydala answered. "Because of the number of North African and Middle Eastern students at the universities in Pittsburgh, another such restaurant thrives there. And some of my sect live there as well. We often have dinner together since one of the men brought a cook to America with him who makes her own *cous cous.*"

"Is your group a large one?"

"Even in North Africa we are not many, but our society is close and our history and culture are very dear to us. We have a legend concerning the appearance of a scientific discovery which will be the destiny of our sect and which, in fact, affected my life directly. It is why I was sent to the Sorbonne instead of being taught the arts of wife and mother which are the usual lots of North African women. Ah! but perhaps I bore you. The bill has been paid by our employer. Perhaps we should go."

"I'm not in the least bored," Leigh protested, "but I guess we should go. It was a great meal. My thanks to our boss." He rose stiffly from the unaccustomed lowness of the divan and, fetching Daydala's purple cape, wrapped it around her shoulders. Together they went out into the night. On the street once more they turned toward the pulsating brightness at the end of the block.

Daydala's voice was so soft, Leigh had to bend toward her to hear it. *"Thursdays Are Red,"* she murmured. "Such an interesting name. I have never gone inside. What is it like, do you suppose?"

"Why don't we go in and find out," Leigh suggested as they turned the corner in front of the discotheque. "Come on. Our employer won't have to pay for this."

They entered the wall of sound and worked their way into the mass of twitching humanity. Daydala's eyes glowed in the flashing lights. "Just like a crowd of dervishes," she shouted at him over the amplifier's noise.

"Let's try it," he shouted back.

She danced with a kind of controlled abandon which even Killer Joe Perou, who invented the whole Twist routine, would have envied. It was three a.m. when Leigh returned to his room. The hotel seemed asleep as he let himself quietly into his room. The small dark man who had been searching his room had been gone an hour by the time John was kicking off his shoes and draping his tie over a handy doorknob. He didn't notice anything amiss because there was nothing out of place. The searcher was also a careful man, a precise man. He had left the room exactly as he had found it.

Leigh lay back on the bed and laced his hands behind his neck, thinking. "An altogether remarkable woman," he decided. "Damned hard to get one's attention off those eyes of hers. There can't be many women in the world with eyes that don't quite match." He was drifting off to sleep and just barely heard his mind tell him, "Or men either."

Snow was beginning to fall when Leigh finally climbed out of bed next morning. Outside the sky was dark and heavy. All the lights of the city were on, trying to pierce the gloom. He looked at his watch and swore at himself. Ten o'clock. Overslept again! It was a constant problem with him. He was basically a night owl and found very little about the morning to charm him from between the sheets. Today the weather certainly hadn't helped.

He stared out of his window onto the rapidly whitening avenue at the dark, huddled figures marching heads down against snow, at the lowering sky and swirling flakes, and hoped that his flight to Chicago wasn't going to be canceled.

He looked at his watch again and calculated. It was too late to try to get out to SPI headquarters and back for his flight in this weather. He decided to try to get an earlier flight to Chicago and check in to Silverman by phone before he left. He packed quickly, went downstairs and settled his bill with the hotel.

There was a line at the airline reservation desk in the lobby. Leigh was squeezed between a physicist trying to get back to Minneapolis (it was snowed in there; all flights canceled) and a slight, dark man in an immense, fleecy black overcoat. The girl at the desk informed him that flights were still departing for Chicago. The storm had hit there yesterday but they had dug out and were all clear. There was one seat on the 11:10 flight to O'Hare. With luck he could catch that plane. He booked himself on it and headed for the door to get a taxi. Behind him, the man in the overcoat got himself aboard a flight to Pittsburgh. The girl at the airline desk was fascinated by this new customer. She had never seen eyes like his before. They didn't match. "It was the funniest thing," she told her roommate that night, "one seemed blue and the other one was brown."

The taxi let Leigh off into a pile of black slush in front of the La Guardia terminal. He checked in at the airline desk for his flight.

"Your plane will be leaving late, Dr. Leigh," the pretty young brunette told him. "You'll have plenty of time for coffee."

It was only then that he remembered the breakfast he hadn't had. He thanked the girl and went to find the coffee shop.

The waitress behind the counter was a big, buxom lass like some Mistress Pinchbottom in a Restoration comedy. She greeted Leigh familiarly.

"Hiya, honey. What can I do for you?" She gave him a massive wink. "That's legal, that is."

"I don't know," he retorted with a friendly grin. "Is coffee, eggs, and a Danish legal?"

"Sure is, doll," she laughed. "I been keepin' my Danish sweet just for you."

"OK. I'd like some orange juice too."

"Comin' right up."

She reached under the counter and got a carafe of orange juice from the cooler, poured him a glass, and then bellowed his order into a microphone on the serving island. Farther down the counter, the man in the fleecy black coat winced.

Leigh ate quickly when his breakfast came. If he hurried, he could check into SPI headquarters before he left La Guardia. Mistress Pinchbottom gave a friendly wave as he left.

Leigh strode off to search for a telephone. The dark man gulped down his scalding coffee and

trotted off after him. Mistress Pinchbottom hardly noticed. She had no eyes for the likes of him.

There seemed to be, as Leigh had feared, none of the old-fashioned enclosed telephone booths left in the terminal. Against his will he had to settle for one of those partitioned counters with telephones on them that have taken the place of the privacy of a telephone booth in so many places in America. He gave the operator his credit card number and heard the phone ringing at the other end. A crisp voice he knew so well answered.

"Good morning. This is Science Processing Incorporated. May I help you?"

If there was one woman who had stayed constant in John Leigh's life in the last ten, hectic years, it was the one on the other end of the line. Emily Parkway had been Silverman's secretary for as long as Leigh could remember. She was in her thirties now, a widow of the Korean war, reliable, discreet, flawlessly tailored, charming, and always there. Emily's voice on the telephone had, for all his years with SPI, been what home and apple pie meant to most men.

"Hi, Emily. This is John. How've you been?"

Emily smiled when she heard the voice. She'd known, of course, that Leigh was coming back to the firm, because Emily Parkway knew everything that affected the running of SPI. She did not know, however, if this new assignment would bring them together again. Joe Parkway had been dead a long time. And she wasn't over the hill yet, but John never seemed to notice. Except that he sent her a postcard now and then she had never been sure that Leigh knew she was any more alive than her typewriter. "Come on," she told herself. "He'd never send a postcard to a typewriter."

She laughed to herself at the thought of getting a card from him beginning, "Dear Typewriter . . ."

The smile in her voice came over to him. "I've been fine, John. We're pleased to hear from you again. How have you been?"

"Busy. I'm changing jobs, you know. Is the Professor in?"

"No, he's out of town. May I take a message for him?"

"Yes. I wanted to give him my change of address. After next Monday I'll be moving to Westpenn Foods, Inc. just outside of Pittsburgh. He suggested that I look for something like this. I don't know if it's exactly what I want, but it looks interesting and the pay's good."

"Fine. I'll tell him. Anything else?"

"Nope. I'm just leaving for Chicago from La Guardia. Hope I can get out before this storm closes everything up. Didn't get out to see you this time, but save a cup of coffee for me and I'll collect

next time I'm in town."

"I'll keep it in mind. That all?"

"I guess so. Good-bye."

"Bye."

"Good old Emily," Leigh thought as he hung up the phone. "Never a hint of surprise that I'm back or off to the food business. Cool as an oyster. Wonder what Silverman (or the rest of us for that matter) would do without her."

He turned and nearly ran into the man with the heavy overcoat. The vague feeling that he'd seen him somewhere before irritated him but the man moved away before he could get a good look. Leigh heard his flight called and stepped quickly to the waiting room where the line was forming for the 11:10 flight to Chicago.

The man watched Leigh go and himself moved down the concourse past the line where he could see Leigh waiting to board his airplane. He glanced idly at the crowd there and then moved on farther to where he would wait for a later flight to Pittsburgh. The trim, neat design of the waiting area appealed to him. "So tasteful," he thought. "Nothing out of place." He had quite a bit of time until his flight would be called so he carefully removed his coat, folded it neatly and laid it on a chair. Then he straightened his tie, adjusted the small, gold emblem in his lapel, and seated himself carefully so as not to crease the elegant press of his black, pinstriped suit. Then, satisfied with his sartorial splendor, he took out a copy of the French edition of *Réalités* and began to read.

The trip from Chicago to Pittsburgh is not long for a skillful driver in a fast car, and Leigh was turning his small red Triumph off the turnpike at an interchange outside the city by mid-afternoon on Sunday. Daydala's instructions were precise, as he had expected, and after only a short way on the winding Pennsylvania roads he found the signs directing him to Westpenn Foods.

The parking lot for the company lay almost directly on a high bank overlooking the ice-choked Allegheny River. There were several large, shed-like buildings near the lot—warehouses by their size and shape, painted white with blue roofs and lettered on their walls in blue with the words "WESTPENN FOODS" and the symbol of a gracefully-designed charging blue bull to complete the company trademark.

Leigh got out of the Triumph and looked around him. A sparse Sunday shift was at work so the lot was not filled. He wandered over to the chain-link fence on the side of the lot facing the river and caught his breath. Just across from where he stood lay a large island on which stood a castle. Not a large castle by European standards, "But," Leigh shook himself, "this

isn't the Rhine. That damn thing is sitting in the middle of the Allegheny River in western Pennsylvania."

The castle dominated a high-rise at the northeastern end of the island. It was surrounded by giant oak and pine trees, the former stark and black against the snow, the latter capped with white. Downstream on the flatter, less rocky part of the island were outbuildings of such size and elegance that much of the world would be glad to call them home. Their white-fenced yards, however, suggested that they were barns. Curls of smoke rose from one of the castle chimney pots and wafted across the river to bring a scent of pine to Leigh's nostrils. "Now who the hell do you suppose . . ." he was thinking when a sharp tap on the shoulder startled him.

"You Dr. John Leigh?"

Leigh turned to find a stocky, tough-looking man in a blue coverall grinning at him in a friendly way.

"Yes," Leigh answered. "What can I do for you?"

The other man tapped his own chest. "It's what I can do for you," he answered. "I'm Joe, the gatekeeper. Dr. Pandarou—her, I mean, not him—asked me to bring you over to the island when you came."

"To the island? You mean I'm supposed to go there?" Leigh motioned to the castle.

"Yep. I guess you're to meet the boss or something. Let's round up your luggage and I'll show you the way."

Joe scooped Leigh's heavy suitcases out of the Triumph and, with the physicist following, strode off in the direction of a blue-roofed shed, somewhat smaller and closer to the river than the other buildings, which proved to be the top of a large elevator.

As they entered, Joe set down the luggage and slapped the lowest button. They started to descend.

"You a medical man or one o' them research fellas?" Joe asked conversationally.

"Research," Leigh answered briefly. "Say, that castle looks like it's really something. What's it like inside?"

"Pretty nifty, from the little I seen. The boss has lotsa money. You gonna work with them Ayrabs. I heard they got sumthin' new going on down in the mine. You don't look like no Ayrab, 'cept for that beard o'course."

Leigh laughed and scratched the dark, unfamiliar growth on his chin. "I guess I'll be in on the something new, if you're talking about the linac."

"Hell," the gatekeeper replied. "I don't know what I'm talking about 'cept rumors. Nobody around here gets told much. In fact," he hinted, "some folks gets downright touchy if you ask 'em anything."

They reached the bottom of the elevator shaft and Joe led the way

out into a white-tiled tunnel that stretched away to another open elevator door at the far end. He threw Leigh's suitcases into a blue and white golf cart which was waiting by the elevator and nodded toward the one at the other end of the tunnel.

"Just run this thing down there and take that elevator to the top. You'll be on the island then. Someone'll meet you there. So long, and good luck."

"So long, and thanks," Leigh answered as the elevator closed on the blue-clad figure.

Alone in the tunnel, John felt claustrophobic. The only relief in the sterile whiteness was a line of waist-high tiles, carved and glazed in bright colors, which ran the length of the tunnel on both sides. The carving was an intricate pattern of twisting lines twining first over, then under a row of round medallions. The colors glowed in the light of luminous panels in the roof which also, Leigh noticed, did not quite conceal the eye of a closed-circuit television camera.

He drove the electric car to the other end of the tunnel, transferred his bags to the waiting elevator and pressed the top button. There was a soft hum, the swish of the doors opening, and Leigh found himself in a second elevator building much like the first. A slight, somehow familiar figure stood waiting for him at the elevator door. He addressed him in clipped, precise English.

"Dr. Leigh?" Allow me to introduce myself. I am Dr. Alexi Pandarou. I believe you have met my cousin, Dr. Daydala Pandarou, in New York. On her behalf and that of our employer, Mr. Tauroman, may I welcome you to Westpenn Foods. The aforementioned persons are waiting to greet you at the Hall. Shall we go?"

Leigh nodded and followed the man's lead to a small blue sports coupé waiting near the elevator shed, puzzling as he walked as to why that man's gait seemed so familiar. They drove up the short winding drive into the castle courtyard. Dr. Alexi (for so Leigh immediately named him in his mind) again took his bags and handed them to the butler who greeted them in the echoing foyer of the Hall. That done, Dr. Alexi directed Leigh to follow him once more. Leading off the main foyer was a huge room not unlike the knights' hall found in most Rhineland castles.

It was, of course, impossible to make so large a room intimate, but an attempt had been made to make it comfortable. Modernistic felt banners disappeared into the gloom of the ceiling. The walls were lined with cases filled with glowing, golden art objects. The long, high, leaded windows let in little of the sparse winter light and dark oak furniture soaked up what little light did penetrate the farthest corners of the room. That bane of old cas-

tles, draftiness, was not completely banished in this modern version, and the banners swayed gently even though all the windows were closed. But the roaring fire, the smoke of which had reached Leigh as he stood across the river, was burning in the great stone fireplace at the end of the room. And grouped around the fire were massive brown leather chairs and a couch. In two of these sat a man and a woman.

"Dr. Leigh has arrived," Dr. Alexi spoke as he entered the room. The seated pair rose and turned to him expectantly.

Alexi made the introductions.

"My cousin you already know, of course," he said as Daydala smiled her welcome.

"And may I present our employer, Mr. Clinton Tauroman. Mr. Tauroman, this is Dr. John Leigh."

"Most folks call me Bull," Tauroman boomed, coming forward in a friendly way. "Nice to have you with us, Leigh. Come and sit by the fire. Daydala will get you a drink, something to warm you up in this wintery weather."

Leigh shook Tauroman's square, strong hand, taking as he did so the opportunity to observe his new boss. Like his castle, Bull Tauroman seemed massive and reeked of luxury. That shirt had to be custom-tailored to fit around such a thick neck. No wonder they called him Bull. Funny eyes. Didn't seem to match the hearty manner or the welcoming voice. Leigh decided those eyes were the signal to watch: this man observed all the social graces with everything except his hunter's eyes.

Tauroman motioned Leigh to a seat on the couch where Dr. Alexi soon joined him, and they began the mindless chatter of the newly-introduced. The weather . . . the age of the castle . . . the roads between Pittsburgh and Chicago. Leigh noticed in Daydala's manner a slight wariness under the femininity, but it seemed directed more at Tauroman and her cousin than at him, and after a while he decided that he had been imagining it.

He had made some polite remark about the scope of the island estate when Bull rose abruptly. "Well, these two people have work to do, I know"—he nodded at the Pandarous—"so we will excuse them and I'll show you around a bit. We'll be seeing them again at dinner, and Daydala can show you the lab afterward."

There was no doubt in anyone's mind that Daydala and her cousin had been dismissed. They rose quickly, murmuring their pleasure at having Leigh as their new co-worker, and promising to see him later, left the room.

Leigh watched them walk to the door and with a start suddenly realized why Dr. Alexi seemed so familiar. He was the same man in the overcoat who seemed to be ev-

erywhere at the airport the day he'd left New York. Interesting.

"Have a shot of Jack Daniels before we go on the tour?" Tauroman reclaimed his attention. "I have a few questions I'd like to ask before we go."

Leigh followed Bull's lead and seated himself again on the couch. He accepted the whiskey Bull poured from a decanter on the low table in front of them, and prepared himself mentally.

"Now then, Dr. Leigh. I like to know my men." Tauroman commenced an astute questioning that was surprisingly not technical, but personal. He had obviously read Leigh's dossier and seemed to be assessing his character rather than his qualifications as a physicist. He seemed to want to know how Leigh would deal with insubordination, laziness, stupidity, or disloyalty. This last seemed particularly to interest him. Then the conversation switched to Leigh's personal ties or, rather, lack of them. After some time, Tauroman rose, seemingly satisfied, and glanced at his watch.

"Well, I think that gives me a pretty good picture of you, Dr. Leigh. If I'm to show you around, we'd better get started. I expect you to keep one thing in mind. I pay well, damn well for this job market, and I expect hard work, discretion, and loyalty. You will be working *with* Daydala and Alexi Pandarou, but you are working *for* me. Remember that distinction.

"And another thing. I'll expect performance and absolute secrecy about your work here. You'll be watched and checked constantly. We don't have a patent clause here because we don't need it." Bull's eyebrows came down threateningly. "No one ever talks about his work here to outsiders."

With that Tauroman seemed to close the book on the subject.

"Now come on. I'll show you around. You will be staying in the guest wing. Your bags have already been placed in your room."

"But I already had reserved a motel room," John protested.

"Cancel it. Much more convenient having you stay here. Now let's have a look at the cattle."

Irritated at this high-handed treatment, Leigh followed him to the end of the room but as they were about to leave, his eye was caught by an exquisite little ceramic statue of a woman wearing nothing but a seven-layered skirt and a large snake. The piece was obviously very old, but in remarkably good condition. It was encased in glass. Leigh paused to admire the figure. Tauroman came back to join him.

"That's a piece of Minoan sculpture. Their snake goddess. It's about four thousand years old. She's aged well, don't you think?"

"Very. I feel I've seen her before. Has she ever been on public display?"

"A less perfect example is in the

Ashmolean Museum at Oxford, but this one's the best of its kind and I've owned it since it first came to light. The same with those."

Tauroman waved his hand possessively at a wall case containing a display of Minoan gold artifacts and eggshell pottery. Leigh looked more closely. He was not a student of the subject, but even he could tell that the collection was of great beauty and the pieces were in remarkably fine condition. He could not begin to assess their value, but he imagined that they must be nearly priceless. He looked again at the snake goddess and smiled. Now he knew why he felt that he'd seen it before. It looked just like Daydala.

"They've an interesting history, those things have," Bull commented impatiently, "but it will have to wait. I want to check the stock."

The tour of the estate took an hour during which Leigh found that the cattle in the elegant barns were massive, cream-colored Charolaise, the famous, outsized beef cattle from France; that Tauroman owned "Pride of Knossos," or "Pride" as he was called, the most prized Charolaise breed bull in the United States; that the mushroom mine ranged mostly under the mainland with only some small laboratories on the island; and that Bull Tauroman was not an ordinary man. He made this last discovery at the estate kennels.

These kennels were surprisingly large and contained nearly forty long, well-cared-for runs. On closer inspection the runs proved to be constructed of an extra-heavy chain-link fencing with about a foot of space between each run so that every one of the great, hulking brutes inside was separated from the next by two walls of fencing and a neutral corridor.

The dogs housed in the runs looked something like massive boxers, but with more powerful necks and shoulders. They were fawn or brindle in color and distinguished from any other dog Leigh had ever known by their ferocious tempers. When the dogs in the nearest runs caught sight of Leigh, they all flung themselves with vicious snarls and slathering mouths at the chain walls of the kennels. The racket brought an incredibly tall, thin man ambling out from a cottage near the kennels. The man slouched over and greeted Tauroman familiarly in a thick West Virginia accent.

"Hey, Bull. How's things?"

"Hey, Hole. Not bad. How're the dogs?"

"Meaner 'n hell as usual. Same as me," Hole drawled. "Who's he? They don't seem to like him much, do they?"

"This is Dr. Leigh, Hole. Hole Jones here is my dog trainer."

Leigh shook Hole's bony hand

and then looked nervously at the kennel runs where three or four of the great dogs still crashed, snarling, against the ends of their cages.

"They look as if they'd be a handful to train," he said.

"Damn right," Hole explained in his lazy voice. "Them's pit bulls. Fightin' dogs. Fightin'est dogs there is, in fact. Them pups that don't bite their old bitch's titty hard enough to make her yelp at four weeks we just take out and drown in the river. Folks used to have dog fights 'round these here parts in the old days. In fact"—he glanced over at Bull and grinned knowingly—"some folks claim they still fight dogs back in the hills over to West Virginia. Say they rig out carryalls with pens and even little benches for the onlookers. It's against th' law, a'course," he added.

"Here. Let me show you how strong one o' them bastards is."

Hole picked up a broom standing against the wall and stuck it into the nearest run. With a lunge the dog inside snapped the broom in two with his teeth and began to worry the broken ends.

"That one's on patrol tonight. That's why he ain't had no dinner."

They strolled down the rows of runs until Tauroman stopped in front of a run containing a young specimen who greeted the visitors with a snarl. In his wild way the animal possessed a kind of brutal beauty which fascinated Leigh.

"Hey, Hole. You think Cassius is ready to take on his daddy yet?"

Without waiting for an answer, Bull lifted a lever which raised a pair of gates between the young dog and a passage into an adjoining run.

In a moment the dog sprang through the opening and lunged at the powerful, scarred veteran in the next run.

Leigh tried to conceal his horror as the younger dog ripped the left ear of the older one nearly off.

"God! They'll kill each other. Aren't you going to stop them before you lose a dog?" he asked as calmly as he could. In his work for SPI violence had often been a necessary evil, and he was trained to use it effectively but never for sport.

"Hell no," Hole replied. "It'd be worth my hide to go in there right now."

"It looks like they'll just have to work it out," Tauroman added.

Leigh looked over at Bull and saw on his face a strange, wild expression as he watched intently the spectacle of the two dogs fighting. The corners of the man's lips were lowered in a slight frown as the younger dog jumped on the back of the older one and attacked his ears and neck. Then there was an ear-shattering snarl as the larger animal rolled, throwing the smaller one to the ground. Like lightning he tore open the throat of the younger dog and stood over him worrying the bloody body of his vanquished foe.

Leigh glanced at Tauroman again. He was smiling.

"Well, Hole," Tauroman said calmly to his trainer, "it looks like the old'un's still champ." He turned to Leigh. "Too bad in a way. I hate to lose a good watchdog. We have to have something to take care of the estate and the mine at night. After dark we let some of these fellows out onto the island for security. Funny thing. We never have trouble with vandals." The humorless smile twitched around the edges of his lips again.

"Come on, Leigh. We're due back at the house for dinner."

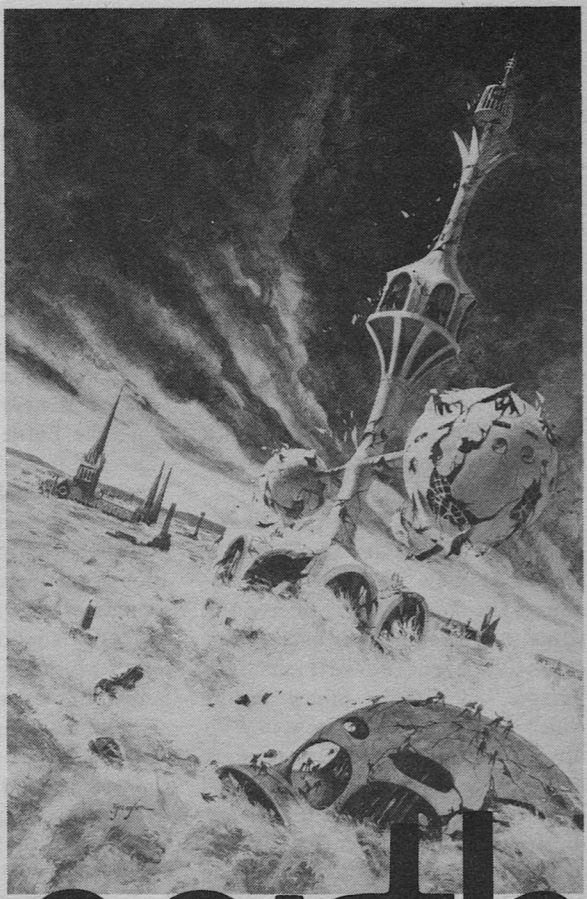
Leigh felt slightly sick as he looked back at the now-quiet victor nosing the carcass of Cassius. He saw Tauroman also glance back and caught a look of immense satisfaction in his large, heavily-lidded eyes.

"So the old'un's still tops. I thought so," Tauroman remarked more to himself than to Leigh. "Cassius looked like he had possibilities but the old'un is just too tough to kill."

Then he turned to Leigh and said, "Let's get on. I'm ready for dinner."

So Leigh decided two things on the spot. One was that Tauroman was not an ordinary man, and the other was that he, Leigh, was definitely not hungry.

TO BE CONTINUED



Moving the Earth can have dramatic effects! Melbourne is flooded as the Earth's oceans and atmosphere "slide" southward in this preview of next month's cover painting (by Jack Gaughan) illustrating Stanley Schmidt's novelette, "A Thrust of Greatness."

how to move the earth

The basis of good science fiction is good science.

STANLEY SCHMIDT

Some months ago, Analog was kind enough to publish a story of mine called *The Sins of the Fathers.* In this story it is discovered that the core of our galaxy has exploded—which, by the way, is something that is in fact known to happen to galaxies. Since the radiation produced is expected to render planets uninhabitable throughout the galaxy, the only possible hope of safety lies in flight to another galaxy. And the only practical way to achieve such an escape for any sizable portion of humanity is to use the Earth itself as a single enormous spaceship.

What would such a trip be like?

First of all, let us admit that a certain amount of "magic" is required; in *Sins,* this is offered by some advanced and ostensibly friendly extraterrestrials. By "magic," I simply mean things which we do not now know how to do—things which would require new physical principles or processes. Some may object to the use of such devices in science fiction, and still more in a speculative but essentially nonfictional article. But I think it would be rather arrogant to assume that we already know *all* the fundamental principles on which the universe operates. (Any elementary particle physicist, for example, is painfully aware that we don't.) What is essential in science fiction, I think, is that new principles be introduced *sparingly* (only when necessary, and not too many at once) and *carefully* (with the new principles formulated in such a way that they don't contradict any old principles in regions which have been verified by experiment). And if this is done, the new principles appear not as magic, but as potentially valid extensions of what we now know—as potentially valid (and as "magical") as relativity might have been if it had been dreamed up by a science fiction writer writing in 1800.

The first new principle needed to move the Earth for the purposes of *Sins* is probably obvious: one which will enable faster-than-light travel (FTL). Only thus will it be possible to outrun the deadly radiation from the exploding core. It is sometimes said (though less often and less confidently now than a few years ago, since Gerald Feinberg and others started talking about "tachyons") that the special theory of relativity proves that FTL is impossible. I find it difficult to consider the usual arguments a real proof; they're far too similar to others (demonstrably wrong) which I can construct by using the earlier theories which relativity replaced (or rather, expanded). I'll say a bit more about this later; for now, the important thing is that I lay my cards on the table and tell just what new principles I assumed for the trip. The Rao-Chang drive, a particular form of FTL with certain assumed properties, is the first.

The other two are new processes

for producing acceleration. The Rao-Chang drive is essentially a means of producing a discontinuous jump from a sub-c (slower-than-light) to a super-c speed. Both above and below the jump, the Earth must be accelerated by direct application of force, and it must be accelerated to a rather large fraction of c before the Rao-Chang "tunneling" can even be attempted. A little calculation shows that any attempt to get the entire Earth up to such a speed by such mundane methods as liquid-hydrogen or even fusion rockets is utterly hopeless. The Earth is *big;* it takes a mind-boggling amount of energy to move it very much. In *Sins,* Rao estimates that the required rate of annihilation, if matter could be converted completely to energy in a photon rocket, would be "roughly comparable to twenty-five Mt. Everests per second." And conventional processes convert only a very small percentage of their fuel to useful energy.

To have even a ghost of a chance, it will be necessary to have a drive which can convert matter with essentially complete dfficiency. We know of one such process, but it requires half of the matter being annihilated to be antimatter, with positrons instead of electrons and antiprotons instead of protons. In *Sins,* I have assumed a similar process, called "induced annihilation," which completely converts ordinary matter (*without* addition of antimatter) to radiant energy, enabling the Earth to use any of its own mass as fuel to run itself as a photon rocket.

Even this uses a *lot* of mass. The total trip, with the story's assumptions, would require a mass ratio (fueled load/payload = starting mass/surviving mass) of about fifty. For this and other reasons, something still better would be highly desirable. The something better I have assumed for the story is an "exhaustless" or "reactionless" conversion process which may be thought of as converting mass directly to produce a unidirectional thrust with no exhaust or other energy wastage—*i.e.,* all of the rest of the mass which is annihilated appears as kinetic energy of the remaining part. This gets the mass ratio down to about six. Such a process is clearly well outside present-day orthodox science; it would make theoretical physicists very uncomfortable (not a bad idea, now and then) since it implies limitations on the generality of both conservation of momentum and the second law of thermodynamics. However, since the exceptions to these venerable laws lie completely outside familiar regions of experience, my conscience does not bother me about using even this.

But these things—the Rao-Chang, induced annihilation, and exhaustless conversion processes, together

with their logical implications—are the *only* really new physics I have assumed in thinking about the trip contemplated in *Sins.* Given them, the consequences for people living on the Earth are determined by well-known physical principles such as those of gravitational fields and accelerations, however produced, and less completely understood applications such as atmosphere dynamics and plate tectonics. And those consequences are awesome. The Kyyra (the aliens who offer to move the Earth in *Sins*) might seem, at first glance, like omnipotent magicians if they can do the things I've mentioned. But all of it is subject to physical law, and despite the magicians' best endeavors, the trip would be arduous beyond anything in human experience.

Qualitatively, several effects come to mind immediately. The trip as advertised by the Kyyra is to be to the spiral galaxy M31 in Andromeda, some two million light-years hence. It starts out with the induced annihilation "rocket" drive thrusting along the axis, with the nozzle at the South Pole. A pole is chosen because of the Earth's spin (which may well be stopped after the trip is underway, to facilitate steering); the *south* pole is chosen because M31 lies roughly north. The reaction begins at the surface and works in toward the center of the Earth. Since the force is initially applied to a small part of the Earth and must be transmitted to the rest of the planet, stresses are set up in the mantle and crust which, even if applied cautiously, can be expected to have "local" effects such as earthquakes, particularly along the boundaries of the continent-bearing plates (*e.g.*, the well-known "ring of fire" surrounding the Pacific). These should subside once a steady thrust state has been achieved, but not until after some rearrangement has taken place.

Operation of a super-rocket nozzle at the South Pole melts the polar cap, for starters, but that's minor compared to other things that happen. The blast also annihilates or at least vaporizes and violently blows water and air which come into it. Such effects give a strong incentive—in addition to the one related to mass ratio—to use this rocket-like reaction for the shortest possible time. (In the story, the Kyyra need it only to get things started, after which it becomes feasible to use the exhaustless drive for almost the entire trip.)

As the Earth moves away from the Sun, not only does the sky change (most prominently, the Sun and Moon are left behind), but the entire heating pattern of the planet changes. The Sun is replaced by controlled leakage from the internal reactions as the planet's main thermal energy input. (Here, by the way, is where the necessity for essentially completely efficient con-

version comes in. When core material is annihilated, the fraction of the released energy which flows out as heat must be very small. Otherwise, the energy reaching the surface would be several orders of magnitude greater than we're now getting from the Sun, with such disastrous effects that I'd have nothing left to write about.) The fact that most of the heat reaching the surface would then be radiating outward from inside the Earth could, in itself, have relatively little effect on the atmosphere, which is already heated largely by reradiation of solar energy from the surface. But it would surely have drastic effects on the oceans (which are *not* used to being heated from the bottom), such as destroying the marine ecosystem. Moreover, the atmosphere would be under attack from another angle: using up the Earth's mass also reduces gravity, and that makes it increasingly possible for atmosphere to escape into space.

Details of all these effects depend very much on how rapidly the Earth is accelerated to (and beyond) tunneling speed. ("Details" on a global scale, of course, will seem like far more than "details" to the people caught in them.) In fact, as it turns out, the relatively simple effects I've mentioned so far are complicated and overshadowed by other effects which are very directly connected with acceleration *per se*. Because acceleration of a vehicle, be it a freight elevator or the Earth, feels to the occupants exactly like a gravitational field, added vectorially to whatever real gravitational field may be present. In the case of the Earth, the real gravitational field is spherically symmetric and has a strength of 1 g (meaning it makes things accelerate toward the center of the Earth at 9.8 m/sec^2). The "apparent gravitational field" which must be added to this if the whole planet is accelerating northward along the polar axis is *not* spherically symmetric. It is uniform, everywhere parallel to the polar axis (pointed south), and its magnitude is everywhere equal to the overall acceleration. This means that the *effective* gravitational field experienced by inhabitants of the accelerating Earth is distorted from spherical symmetry, and that has all kinds of dramatic effects. Just what those effects are, and how drastic, depends on how large an acceleration is used—which also determines the overall time scale for the trip. So, to cite details, let's pick a value or two.

Assuming the means to be available, at least some people might prefer to use the highest acceleration they could stand, to get the ordeal over with as rapidly as possible. Stephen H. Dole (see Bibliography) suggests an upper limit of 1.25-1.5 g for the gravitational field of a human-habitable

planet. If the acceleration used is 0.5 g (after a gradual build-up period, of course, to avoid drastic "jerk" effects which I'll mention later), the effective gravitation everywhere on Earth initially lies somewhere between 0.5 g and 1.5 g, so this seems to be a reasonable value to use for a trial upper limit of possible accelerations.

This value of acceleration, if used throughout the accelerated parts of the trip, leads to a total trip time of some 7.5 years, plus any extra maneuvering time needed for settling into a new home in M31. Figuring the travel times is somewhat tricky; I did it approximately by using the graph of Figure 1, which shows some important aspects of the way in which the Rao-Chang drive is assumed to extend relativity. (If you don't care how I did it, skip to the next paragraph.) I assume, for this paragraph only, that you have at least a nodding acquaintance with the relativistic effects of mass increase and time dilation. If not, perhaps the best way to give you an idea of what the graph says is through a couple of examples. At $v/c \cong 0$ (meaning the kinds of speeds encountered in everyday experience), the factor $\gamma = 1$, which simply means that mass and time are not significantly affected by such slow motion. At $v/c = 0.8$, or motion at 4/5 of the speed of light, though, the factor is 1.67. What this means is that an object with this speed is 1.67 times as resistant to acceleration, and ages 1.67 times more slowly, than when it is stationary or moving slowly. (This much is common garden-variety special relativity, well tested by experiment, much oversimplified in this brief description, and much better explained, though necessarily at greater length, in *Space-time Physics,* cited in the Bibliography.) The new part of the graph, to the right of the asymptote at $v/c = 1$, shows what is assumed to happen at speeds higher than c in a universe where the Rao-Chang drive works. (If such things interest you, you might notice that it's derived from the sub-c relativistic form simply by changing one sign under the radical.) For example, at $v/c = 1.25$ ($= 1/0.8$), the factor is also 1.67—the same as at $v/c = 0.8$. The reason all this is important to estimating the trip time is that parts of the trip occur at speeds where these effects are significant, and they had to be taken into account; all trip times in this article are measured on the Earth, and not by an observer fixed in our galaxy. Moreover, when I say that the acceleration is maintained at 0.5 g, this also is measured on the Earth—for example, by standing on a bathroom scale at the North Pole. As for what this means, I could state it generally in rather complex terms, but for our purposes an example will probably do at least as well. The time (measured on Earth)

to go from v = 2c to 3c (or vice versa) at constant acceleration is assumed to be the same as that required to go from ½ c to ⅓ c (or vice versa) at the same acceleration. Given these assumptions, trip times and distances covered can be estimated (as precisely as one cares to bother with) by dividing the graph up into small velocity intervals, using the average γ to estimate time and distance in each interval, and adding up all the results.

Skipping the gory details, I can summarize the results thus. The trip consists of the following main phases:

1. *Initial acceleration*, to about ⅔ c. Thrust is started by induced annihilation with exhaust at the South Pole, soon superseded by the exhaustless direct conversion process. The center of reaction is moved as quickly as possible toward the center of the Earth, to keep things as spherically symmetric as possible and to minimize local stresses on the brittle crust. This phase lasts about eighteen months and covers about half a light-year, which is hardly enough to produce visible progress against the stars. (The Sun fairly quickly shrinks to a relatively bright but no longer helpful star, so it's obvious that we've gone away from it. But it's not so obvious that we've gone *toward* anything else. Any mountain climber knows this feeling.) The amount of mass consumed can be calculated by using equations which Poul Anderson has conveniently assembled in the Appendix of his book cited in my Bibliography. (My reactionless drive is what he calls a "field drive." Calculations for the later phases of the trip also use the assumption that energy consumption in super-c is described by Figure 1 in much the same way as elapsed time. Very briefly, the relativistic mass increase is proportional to an increase in kinetic energy, and that's equal to the work done to produce it.) Roughly speaking, the mass and therefore the *average* surface gravity drop to about sixty-five percent of their starting values during the initial acceleration phase, and escape velocity (important in estimating rate of atmosphere loss) to eighty percent. These gravity figures are misleading, however, because of the acceleration effects I'll get to shortly—the *distortion* of the *effective* field by the applied thrust is much more important than the decrease in the average field.

2. *Tunneling*, a discontinuous jump (requiring negligible time and energy; the latter is also implicit in Figure 1) to 1.5 c, followed by *post-tunneling acceleration* to about a million times the speed of light. One assumed property of the Rao-Chang universe is that objects moving faster than light and those moving closer are mutually undetectable; thus, tunneling causes the stars to vanish, leaving an empty sky and feeling of isolation which may be psychologically damaging

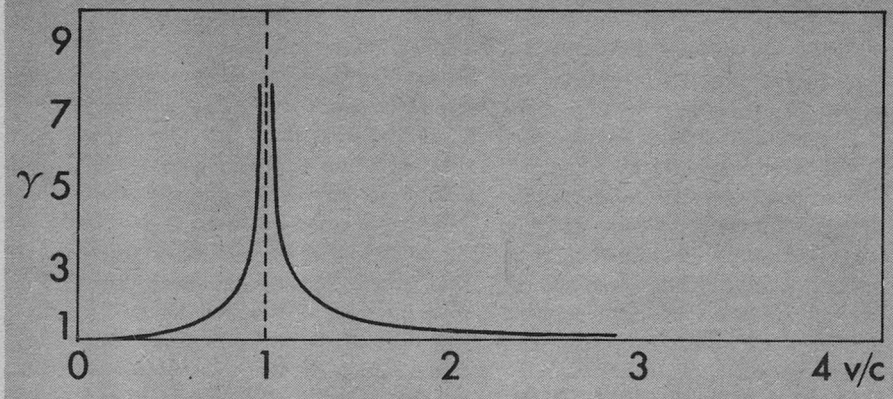


FIGURE 1.

Mass increase and time dilation factor $\gamma = 1/\sqrt{1-(v/c)^{\pm 2}}$, *where* v = *velocity and* c *is the speed of light. The left portion of the graph* ($v/c<1$) *is identical to that in conventional relativity theory. The right portion is the hypothetical extrapolation corresponding to the (fictitious) Rao-Chang drive.*

to people out on the surface. However, most survivors at this point will be spending most of their time underground. The darkness in the middle portions of the trip would alone be enough to eliminate natural photosynthesis on land and sea, totally disrupting the ecology and exterminating vast numbers of species. However, the field -distortion effects get there first.

This acceleration phase lasts eighteen months and covers about fifty thousand light-years. Mass and average surface gravity (remember the precautions under #1) drop to forty percent, and escape velocity to sixty-five percent. If these figures were steady and uniform over the surface of the Earth, and other atmospheric parameters such as exosphere temperature were close to their present values, the "characteristic time" for the loss of the atmosphere (the time to lose a bit more than sixty percent of the starting amount) would be on the order of a couple of centuries.

3. *Cruise* in super-c, at constant speed of 10^6c. About 1.7 x 10^6 light-years must be covered (depending on whose estimate you use; such things still can't be measured very precisely), for a duration of 1.7 years. (This could be shortened somewhat by using a higher cruise speed, at the expense of more difficult navigation; it probably isn't worth it.) During this phase, the field distortion effects are absent, so conditions might

seem, in this sense, a bit more "normal" than during the acceleration phases. However, the strength of gravity is only forty percent of what we're used to, and the atmosphere has probably already become thin enough (for a reason not yet fully explained) that it will be difficult, if not impossible, for people to go outside without protection. It will continue to be lost.

4. *Tunneling* back to ⅔ c (the stars—the unfamiliar stars of M31—come back); and *final deceleration,* again at 0.5 g, lasting eighteen months. Mass and surface gravity are down to seventeen percent, escape velocity down to forty percent. This corresponds to a characteristic time for atmosphere escape of just a few days, so effectively all atmosphere not trapped in sealed containers will be lost by the end of the trip. The remaining solid shell of Earth is not more than about four hundred miles thick, which may be thin enough to pose a danger of explosion or collapse. It may have to be deliberately broken up into smaller pieces; or possibly maintaining spherical symmetry to the end isn't the best way to do things. In any case, it's pretty clear that we are *not* talking about transplanting our home to a new galaxy. Earth as we know and love it is dead by the end of the trip. It has served as a vehicle, but for new homes we must find new planets.

Now that we have a general outline of the trip, we come to those most important effects produced by the distortion of the effective gravitational field. Perhaps the most immediately striking of these is to change the effective "up-down" direction. To a person standing on what had been a level plain (or floor or ocean), the appearance and feel of this is exactly as if the Earth were tilting under his feet. All over the Earth, the ground appears to slope downward to the south. The amount of tilt, and the strength of the effective field, vary with latitude. The table below shows these quantities for several latitudes, for an early quasi-equilibrium state with a steady acceleration of 0.5 g, a negligible fraction of the Earth's mass used up, and the exhaustless drive in operation.

EFFECTIVE GRAVITATIONAL FIELD DISTORTION

Latitude	*Effective g at Surface*	*Apparent Southward Tilt*
North Pole	1.50 g	0.0°
60° N	1.45 g	9.9°
30° N	1.32 g	19.1°
Equator	1.12 g	26.6°
30° S	0.87 g	29.8°
60° S	0.62 g	23.8°
South Pole	0.50 g	0.0°

Tall buildings will fall when the tilt becomes steep enough, and landslides—even on formerly level ground—will be widespread. The steepness of tilt will increase continuously as mass is used up and the spherically symmetric true gravitational component becomes weaker.

One of the first globally important consequences of this effective tilting will be a tendency for the oceans and most of the atmosphere to flow "downhill" and concentrate (to such extent as they aren't blasted or blown away) at and near the South Pole. In an equilibrium state, sea level and layers of constant atmospheric density correspond to equipotential surfaces of the effective gravitational field—in fact, this may be taken as an operational definition of gravitational equipotentials. Normally these surfaces are (practically) spheres concentric with the Earth. For the distorted effective field, they are distorted and displaced southward, as shown for one sample case in Figure 2. (Figure 2 also shows arrows representing the strength and direction of the effective field at the points shown in the table.)

Calculating the distorted equipotentials is a rather laborious and necessarily approximate process involving a good deal of numerical integration. I won't show the details here, but I will briefly outline the method for anybody who's interested. The first requisite is a graph showing how the true gravitational field strength varies with distance from the center of the Earth, both inside and outside. This can be obtained by integrating a graph of density versus distance. (The exact shape of this graph depends on whose book you read and how recently it was printed. For phenomena on as large a scale as I was dealing with, I felt reasonably justified in using a somewhat simplified version in general agreement with several sources but ignoring some of the fine local fluctuations.) The field strength function can then be integrated to find the true gravitational potential, and the radial component of the acceleration field can be similarly integrated to find the "potential" associated with the thrust. The sum of these is the effective potential; an equipotential is drawn simply (!) by calculating a number of points with the same potential and connecting them by a smooth curve.

The particular equipotential shown in Figure 2 is at present sea level at the equator, but passes a couple of thousand kilometers underground at the North Pole and a couple of thousand above at the South. To estimate where the oceans wind up, I looked for the boundary of the equipotential which would just accommodate all the water in the oceans in the dome-like region between itself and the surface. This turns out to be, very roughly, at about latitude 73°

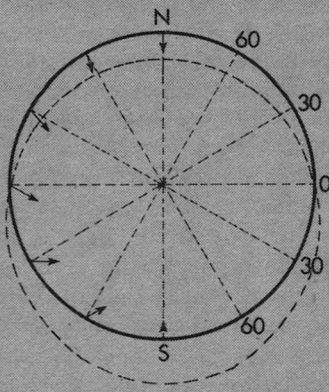


FIGURE 2

Gravitational field distortion. With a 0.5 g northward axial acceleration of the Earth, the effective gravitational field changes both strength and direction. The arrows represent the effective field at several latitudes (marked in degrees): the length of each arrow shows the relative strength of the effective gravity, while its direction shows the effective "vertically downward" direction. The solid circle represents the surface of the Earth; the broken "circle" is approximately an equipotential of the distorted effective field.

south—essentially all the oceans gather there in what appears to an observer as a big circular puddle (some 2,500 miles across) with sloping shores and a maximum depth of some 300 km. (It's questionable how well the Earth could support such a layer of water, or how it would adjust to it. We do know that the crust was warped appreciably by the weight of thick glaciers during ice ages.) Assuming these figures to be at least roughly correct, despite the problem just mentioned and the approximate nature of the calculation, this puts the Antarctic Puddle entirely south of all normally inhabited continents and major islands. This eliminates permanent flooding problems—but substitutes severe drought—for all populous areas. Temporary—tidal-wave-like—flooding is *not* eliminated. That water goes over anything in its way as it moves south. If the thrust is jumped immediately to its full value, the water will be so badly out of equilibrium that it will move fast and deep right away, and presumably continue sloshing back and forth for some time thereafter. To eliminate such a "jerk," and allow the water to redistribute itself by means of relatively slow and shallow currents, the thrust will have to be built up gradually.

Most of the atmosphere will also gather in the far south, and since moving air means "wind," some fairly unbelievable weather will ac-

company its migration. Once it has stabilized, its loss will make it impossible for unprotected people (or other air-breathing organisms) to survive on the surface in the north. This alone will destroy the surface ecology, and people going underground will have to gather and recycle air, as well as everything else. And their buildings had better be strong—when the atmospheric pressure gets low enough, those which are airtight but weak will explode, just as houses already do in tornados. Transportation will become a formidable problem. Air-breathing combustion engines won't work in the north. Aircraft (except rockets) will fly only in the south, and their altimeters will have little directly to do with altitude. The air collecting around Antarctica escapes into space even faster than predicted by the average escape velocity figures, because it's gathering right where the effective gravity is weakest.

All of these acceleration effects will change—generally for the worse—as time goes on and the true gravitational field weakens. Only in the extreme south will gravity actually invert (and there only very late in the trip), but everywhere the ground will tilt more and more steeply.

There is one more acceleration effect that needs to be considered. According to the recently developed theories of plate tectonics (see Bibliography), the continents themselves rest on huge plates which are floating on the asthenosphere, a "plastic" layer of the mantle which, like glass, acts rigid under short-term stresses but flows under long-sustained ones. Given time, presumably the asthenosphere would also like to flow south, carrying continental masses with it and quite possibly tilting, bending, buckling, bumping, and fracturing them in the process. Normally the flow is appreciable only over a geological time scale (though it may be speeded up somewhat when the Earth is being heated predominantly from inside), so I would not expect actual movement of this sort to be a major problem in a trip lasting a few years or likely even a few centuries. However, the stresses built up by a 0.5 g acceleration may produce local buckling and such which, though minor on a global scale, would be unnecessarily catastrophic as far as the passengers are concerned.

Some of the effects of the 0.5 g acceleration considered so far are so drastic, and the time available to cope with them is so short, that it might be preferable to use a much lower acceleration for at least part of the trip, despite the disadvantages that has.

The main disadvantage, of course, is time. Assuming an acceleration of 0.01 g, and the same critical speeds as before, the time scale is increased, not quite by a

factor of fifty, but almost that. The initial acceleration phase lasts seventy-five years and covers some twenty-five light-years—enough to produce easily noticeable but generally not drastic changes in constellations. Mass and true-gravity figures are the same for the high-acceleration case, but more meaningful, since the field distortion is much less. Another century and a half are spent accelerating and decelerating in super-c—no constant-velocity cruise phase is needed—and the final sub-c deceleration takes another seventy-five years. So altogether this trip lasts some three hundred years. Nobody who starts it finishes it—but maybe more of their descendants will.

The major advantage of the low-acceleration method is that it's gentler. Seismic disturbances, gravitational field distortion and its associated unpleasantries—all those things will be reduced. Physical stresses on the Earth, buildings, and inhabitants are all smaller, and so less (physical) damage should generally result. (Psychological damage may be another question.) The effective gravitational field changes very slightly—magnitudes differ from normal by an amount which is at first hardly perceptible ($\leq$one percent); the "tilt" angle is initially less than one degree and even at journey's end doesn't exceed four degrees.

Water and air still collect in the Southern Hemisphere, but the southern sea is larger, shallower, and more gradually varying in depth. I estimate the maximum (polar) depth to be about 30 km and the northern boundary to be at about 35° south latitude. (Which, unlike the high-acceleration case, does threaten to flood some populated areas—in particular, New Zealand and parts of South America and Australia.) The gentler equipotential slopes may leave enough atmosphere in middle and somewhat northerly latitudes to allow at least occasional surface exposure for a considerable while; travel will be easier and leaks less disastrous. The rate of atmospheric escape in the south is not nearly as bad as in the other model.

In essence, this approach buys time. Ultimately, the Earth becomes uninhabitable either way, but this way the initial damage is not as high. There is more time when conditions are livable enough to make adjustments with reasonable ease. The price is that the trip takes a lot longer. With the high acceleration, conditions are more stringent, but a significant number of survivors may make planetfall in a few years. With the low acceleration, more people live out their natural lifespans, but none will live to finish the trip. There will be generations in the middle who never see a normal planet with a sun—even generations who never see a starry sky.

Either way—or by any other vari-

ant such as an intermediate acceleration or a trip using several different accelerations—I think my original claim is not exaggerated: the trip would be arduous beyond anything in past human experience. In this article, I have dwelled on problems, not solutions. In fact, I have barely scratched the surface of the problems—I have mainly indicated the basic *physical* problems people will face if ever they should have occasion to attempt such an odyssey. I have only hinted at the overwhelming array of practical and human problems that would grow out of these. Things like: How do you provide enough life-support equipment to enough people so that anybody gets there alive, particularly when you're simultaneously facing an unprecedented wave of natural disasters at the very start? Even if you keep them alive, how do you keep them sane? If you use a high acceleration, what do you do about all the medical problems it causes, for example in pregnant women and people with weak hearts? If you use a low acceleration, how do you make sure the trip is actually completed instead of becoming another lost-generation-ship-with - forgotten-mission story? How do you keep any semblance of civilization alive? If you somehow succeed in all these things, how do you insure that the totalitarianism that seems almost inevitable is temporary? How do you handle the logistics of getting the survivors off the Earth and onto a new world once they get there?

And so on. And the inclusive question arises: Are all these problems *too* overwhelming? Would people actually have any chance at all of solving them?

To this I can't give a rigorously reasoned, experimentally verified answer. But I'll venture a personal hunch: I think so. Not everybody; not by a long shot. The ones who make it, if any do, will be tough and adaptable. But I suspect there are some folks around who have what it takes. I even have some ideas of how they might do it.

But those are beyond the scope of this article. However, the thought *has* crossed my mind that therein lies a tale or two. ■

BIBLIOGRAPHY

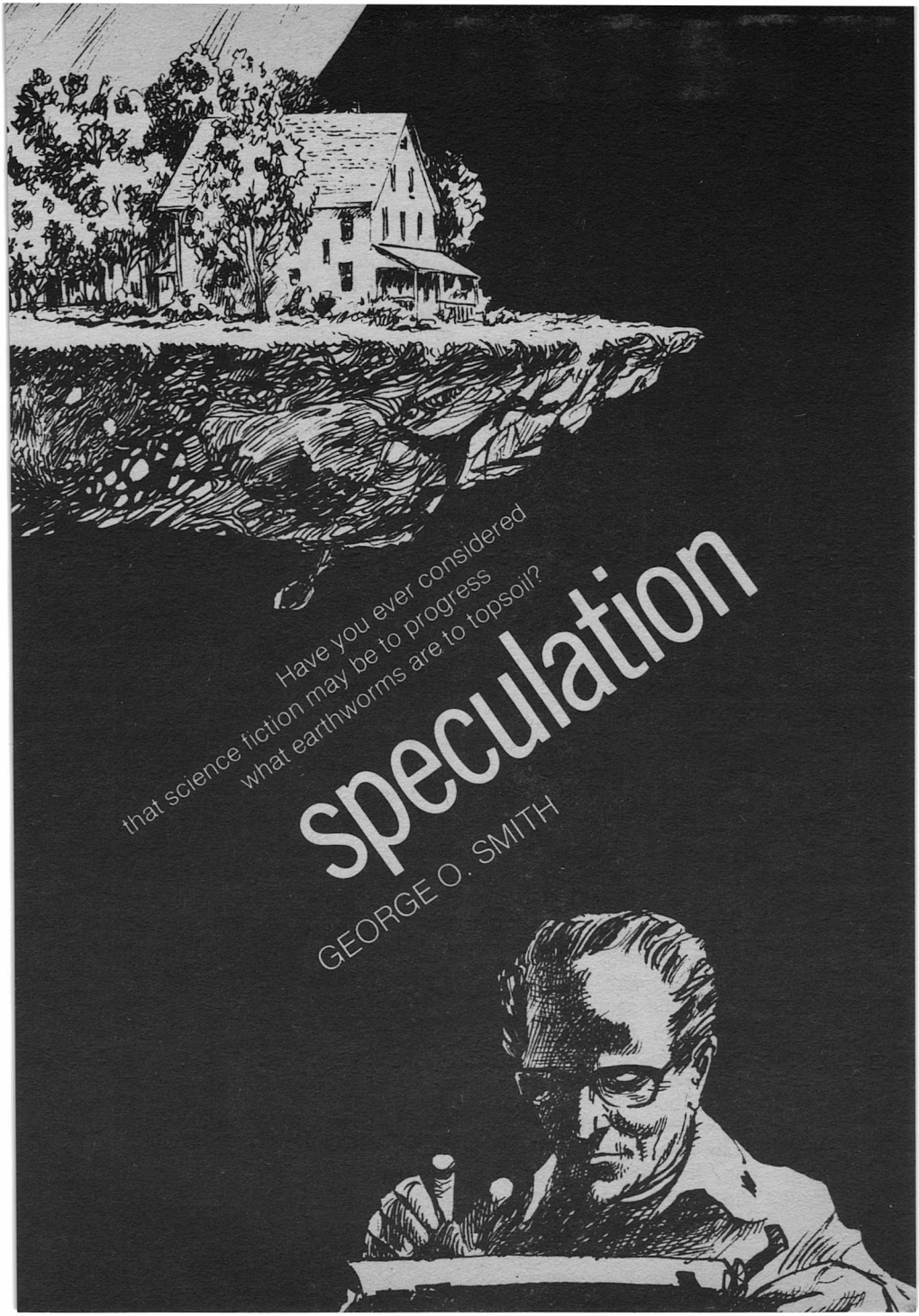
Poul Anderson, *Is There Life On Other Worlds?* New York, Collier (1963). (See especially pp. 190-201.)

Stephen H. Dole, *Habitable Planets for Man (Second Edition)*, New York, American Elsevier (1970). (See especially p. 12, pp. 36 ff.)

Edwin F. Taylor and John Archibald Wheeler, *Spacetime Physics*, San Francisco, Freeman (1966). (See especially pp. 97-98.)

J. Tuzo Wilson (Ed.), *Continents Adrift* (Readings from *Scientific American*), San Francisco, Freeman (1972).

JACK GAUGHAN


Have you ever considered
that science fiction may be to progress
what earthworms are to topsoil?
speculation
GEORGE O. SMITH

The couple sat on the lawn in front of their small but adequate farmhouse cottage, silent with their thoughts. The lawn was mown with the care shown by a man who looked upon lawn-mowing as a necessary evil rather than a painstaking avocation. The quarter hectare of it was spotted with the random yellow of dandelion and the flat patch of plantain; obviously this was no putting green. Beyond the lawn and to the left began row upon row of corn, planted in hills carefully spaced, in fine contrast to the random care of the lawn. To the right was a field of potato plants, spaced with the same agricultural care. Not to be seen from where the couple sat was a serrated row of trellises that carried green peas and beans.

The day was almost done; it was late afternoon. The sun hung low in the western sky.

A large round raindrop hit the ground near the couple, followed by a second and a third, and then more with increasing rapidity. The man looked up; overhead was a dark cloud drifting slowly toward the west. The man looked down at his watch and nodded. "Rain," he said needlessly.

The woman laughed. "What was your first clue, James?"

"The color," he said brightly. "I could see quite clearly that it wasn't orange juice. Furthermore, it's right on time. We'd better—"

A lightning bolt illuminated the cloud from within, like firing a photoflash bulb inside a garden lantern. The scattering of drops turned into a barrage.

"—get inside," he finished, making a run for shelter. Under the overhang of the front porch roof, Lois and Jim Henderson stood elbow to elbow, watching the rain pattern change from a barrage of large round drops to a smooth downpour that would irrigate the land without smashing the vegetation flat. Lightning flashed and the thunder split the air.

The dark cloud drifted on toward the west, finally obscuring the sun, which was smaller by a third the diameter and by half the radiation—because the scene is Mars.

"What's for dinner, doll?"

Lois Henderson turned to him. "Lamb chops, mashed potatoes, and asparagus spears with hollandaise sauce if you help. Otherwise it will be precooked lasagna dinner in a compartmented plastic plate."

Jim shuddered. "I'll help," he said. "I'll peel the lamb chops, supervise the boiling water for the smashed spuds, and sharpen the asparagus spears."

"Canned lasagna?" asked Lois Henderson with a lifted eyebrow.

Laughing, they went inside. The day was done.

The following are notes and clips arranged in order by Major John Hopewell, who was assigned to prepare historical memoranda of the events that led to the creation of Mars Colony:

1. The final paragraph of a letter from the Editor of *Speculation Magazine* to a former author who, having retired from active engineering, found time to renew his writing:

Story problem: Every SF reader knows that someday we'll set up self-sufficient colonies on the Moon, Mars, in orbit, or elsewhere. OK, how do you make them self-sufficient? I mean, from the ecological point of view. What happens when you find out that you need bees, or boll weevils, or earthworms if you want your "self-sufficient" gardens to grow? And what happens when you import them at great cost, and then find out that you need their specific predators to keep them from eating you out of house and planet? And so on, and so on. Interested?

J.H.C., Jr., Editor

2. Pages torn from *Speculation Magazine,* carrying the story, "Colony," by Wesley Long. The story is not included here because of its length, and because it is a work of fiction that contains no useful technical details. The work is mentioned because it appears to have been the first to recount the adventures of human characters living in an experimental extra-terrestrial colony.

3. A letter to the Editor of *Speculation Magazine,* August issue:

Sir:

Wesley Long's story in the July issue was a welcome return of an old-timer. Indeed, "Colony" would have received my vote for the best of the year were it not for two irritating things:

First, Wesley Long overworked the main theme twenty-five years ago. The idea of a political appointee gumming up the works by swinging his administrative authority in a series of inept directives, whilst the deposed acting technical director races around avoiding disaster by correcting the appointee's stupid mistakes is almost as tired as the counterpoint theme in which Our Hero woos and wins the senior scientist's beautiful daughter.

Second, the idea of doming over a crater on the Moon to retain an atmosphere suggests that the bragline on your cover be altered: The word "Fact" should be printed in the four-point type used for the backside of insurance policies, and the word "Fiction" should appear in the 72-point type used by tabloid newspapers for their screaming headlines. Allowing Wesley Long's use of an oxygen-enriched atmosphere to permit a lowered pressure, boldly borrowed from the Apollo Space Program some decades ago, a bit of button-poking on the minicomputer will turn up with an estimate of something like a metric ton per square meter. Mr. Long was clever enough to keep dimensions to himself, but his description of the farmlands, and driving along the roads under the dome, and other colonial activities hardly clue-in with a small area.

Better they should dig tunnels and live underground. Any dome covering square kilometers would have to be heavily braced to hold the pressure, and probably made of welded steel—meaning that the colonists would have to live under artificial light anyway, so why not underground?

Sincerely, K. C. Jones

Sorry, Mr. Jones, but you're barking

up the wrong tree. Wesley Long's story was written as fiction and intended to amuse, not presented as a technical proposal, not even as the program plan for a feasibility study. Your contention that he overworked the main theme may be true, but it is one of the best ways to recount the details of a highly complicated background. Frankly, if the political appointee had been properly educated and properly briefed to make the proper decisions, there would have been no story.

J.H.C., Jr., Editor

4. Second letter to the Editor, same issue:

Sir:

I'm not quite sure what Mr. Long intends to dome his crater with, but the absolutely shatterproof substitute for glass was invented by science fiction during the second and third decades of the Twentieth Century—it's now up to the engineers to reduce the idea to practice.

However, I am interested in the statement that the Apollo astronauts brought lunar soil samples home and were amazed at the phenomenal growth that resulted when the soil was strewn over the top layers of potted houseplants.

Is this true, or more of Mr. Long's fiction?"

Yours truly, C. Serpent

The account is true, but it was NASA horticulturists, not the astronauts. However, their explanation was that important trace minerals, normally leached out of terrestrial soil by rain and surface water, remained present in the lunar soil because there is no water on the Moon. *J.H.C., Jr., Editor*

5. Third letter to the Editor, same issue:

Sir:

I read "Colony" with much interest and vote it tops, so far, for the year. However, I have one amused criticism: The inept political appointee may have been able to bungle his way through toward disaster a few hundred years ago, but not today. For example, if Christopher Columbus had been operating the way Nasa planned the Space Program, they'd have had him cruising up and down off the coast of Portugal for several years to prove that his ships and their crews could take the protracted voyage. Next, there would have been several trips to permit Columbus and his map-makers to survey the territory and select the best landfall. Finally, of the three ships, two would drop landing parties while the third cruised offshore as backup.

In other words, Wesley Long's colony on the Moon would have been established according to thoroughly drawn plans and staffed with completely trained colonists, and any political appointee would have been named director only after a brain-busting investigation of his talents, his background and experience, his political beliefs, and his financial status and where he got it. Right?

Regards, (Ms.) Anne Thrope

Thank you. You are undoubtedly

right. No one is going to squander a fair chunk of the GNP for umpty-three years on an unplanned enterprise. I also point out that the voyage of Columbus was not completely without plan. Chris knew from the Norsemen that there was land on the other side, so it was not a wide-eyed venture.

J.H.C., Jr., Editor

6. Carbon copy of a letter from the Editor of *Speculation Magazine* to one Al Fresco, apparently an aspiring writer known to J.H.C., Jr.; note the familiar salutation:

Dear Al:

Your suggestion that if an extra-terrestrial colony be given serious consideration, it should be Mars, is sound. There is water on Mars, and there is an atmosphere. That both are in deplorably short supply is still a cut above zero-zero. Even a dry crust is better than no bread.

However, your news clip from the *Boston Globe* belongs in the ho-hum department along with that old filler about the Amazonian Bot-fly that goes whiffling along at 870 miles per hour. (They didn't bother to convert it to metric; the filler died and left no address, where it rightfully belongs.) So some characters claim that the sidewalk was swaying along Massachusetts Avenue? Please note the dateline: 17 March. In Boston? Forget it!

Regards, J.H.C., Jr., Editor

The shuttle from Earth entered the boundary of Mars Colony fifteen kilometers above the surface and dead center above the colony itself. There was no abrupt interface, only a small warning lamp went on to inform the bored pilot that he was about to earn his pay.

He freed the controls from their stowed condition for spaceflight and tested them to make sure the surfaces obeyed wheel and pedal. At fifteen kilometers altitude, the surfaces weren't even mushy; they had no bite whatsoever. The pilot oriented the shuttle for landing using the attitude jets and then simply waited until the surfaces found some atmosphere to pass through. At seven kilometers, the surfaces began to take hold, and by three kilometers the pilot was heading toward the landing strip some ten kilometers outside of the colony proper, on the red sands of Mars.

The landing was uneventful; run of the mill. The pilot watched his passengers debark, to be met by members of the colony. He left the shuttle last and followed them into the low, squat building that served as terminal, control, and everything else. He did not follow them through. Instead, he turned once inside and went to the main office where a lone man presided over mission control.

The one in the office said, "Greeting, Tony. How's the trip?"

"Fine," grinned the pilot. "We sighted three whales and one waterspout."

"No eighty-meter waves? So what did you bring along with your gang?"

"Didn't bother to read it," said the pilot, handing the terminal official a long envelope. It was not sealed, but snapped closed with a

button fastener. The terminal official started to open it, but the pilot said, "Don't forget to change your hat, Pete."

Pete went through a brief pantomime of removing one hat and putting on another. "Mission Control is now off duty," he announced. "Peter Wilkins is now in charge of Inbound Customs. Why I have to go through this foolishness, I don't know. They give everything the good old one-two before they—*Holy Jehovah on a raft!*"

"Trouble?" asked Tony.

"I'd like to think not. But it's one carton of unidentified items consigned to Mrs. Walter Laughton."

"Unidentified?"

"Unidentified. Most likely because someone has the quaint notion that anyone in the exalted position of the Laughtons is immune to inspection."

"So what are you going to do?"

"A fool," said Pete Wilkins, "is someone who hasn't sense enough to drop something that's hot." He reached for the telephone, poked buttons, and waited until a woman's voice answered.

"Morning, Lois. Pete Wilkins here. Is the master about?"

"Wait five, Pete. Jim's out conducting his daily warfare against the ubiquitous potato bug. Hang on."

A half-minute passed. Then: "Morning, Pete. What's ruffling your feathers?"

"Sorry to bother you. But we've got one carton of unidentified items addressed to Mrs. Laughton."

"OK. The bugs can wait; they don't really eat that much. I'll be over to take charge as soon as Lois finds the hat with the gold braid."

"I hear you. Take care." Pete hung up and went through the hat-changing routine again. "Inbound Customs is now closed and all cargo impounded. And since Jim Henderson couldn't get here in less than a half-hour, even if he drives that little electric like the devil was after him, you may address me as Pete the Bartender for the next thirty minutes. The same, Tony?"

"Thought you'd never ask," sighed the pilot.

Jim Henderson arrived in due time and said "no" to their offer of a drink. He read the manifest and said, "Everything's in order except this one for our leader's wife. Release the rest, I'll take charge of this."

Henderson sliced through the seals and opened the carton. Item by item he took the boxes and cans out and read the labels. "Here we go again," he said, shaking his head. "Reseal it and impound it. I'll go see Governor Laughton and explain."

Walter Laughton greeted Jim Henderson cordially. After the amenities were over, he asked, "What's the occasion of this visit, James. You sounded as if there were some sort of trouble."

"Pete Wilkins, over at the terminal, who plays everything from Mission Control for the shuttle to the Hawaiian Ukelele for the tourists, intercepted a package con-

signed to your wife. I opened it, identified the contents, and impounded it. I'm here to explain."

"Intercepted—Identified—Impounded—?"

"Yes. Its contents were not properly identified. And if they had been, the package would have been stopped on Earth. It's contraband."

"Contraband?"

"Quite. And I am here to remind you that neither official nor diplomatic immunity removes the prohibition of items listed as posing a threat to the future of Mars Colony."

"So you took the liberty of opening my personal mail?"

"Governor Laughton, I do not consider it a liberty to perform a task that I am officially required to do. No matter who you are, roach powder, ant poison, insecticide sprays, and those little packaged goodies that mice go gourmet on—only once—are strictly verboten."

"Now see here, Henderson, ecology is ecology, but a horde of vermin and varmints is just a bit too much."

"Before we find ourselves in a hassle, let's understand our relative positions. Your title of 'Governor' was picked for its euphemistic sound; fact is, you're really the warden of the batch of civic felons who are here working out their debt to society. They're here because the law finally realized that there is some difference between the felon who made the mistake of getting caught with one hand in the cash drawer and the felon convicted of a crime of violence. You have the authority to administer that operation. But that's where it ends. When it comes to running Mars Colony, we handful of colonials will follow the rules and you and your charges will take orders from us. Understand?"

"I shall certainly check on that."

"Do so. I urge you. Mars Colony is a carefully balanced ecology, and we're not about to have the balance upset by some headstrong character who doesn't know which side is up."

"But roaches, mice, mosquitoes—?"

"Governor, you're back to that old one about why Noah didn't swat the mosquitoes in the Ark."

"I was not attempting to be facetious," snapped Governor Laughton.

"Neither was I," replied Jim Henderson, easily. "What I meant was that it is entirely possible that Noah couldn't have recognized those little wiggly things in the Ark's bilgewater as mosquito larva, even if he'd known they were there."

"What do you mean? How does that apply?"

Henderson paused, thinking. First, how detailed must he get, and second, how much could this man understand. "Do you know how Mars Colony was established?" he asked, stalling for thinking-time.

"Since I am, as you so bluntly put it, a political appointee to an administrative position, I plead pardonably guilty to having a paucity of technical expertise. So *you* tell *me*."

"All right, in quite simplified explanation. They stripped off a monumental payload of terrestrial topsoil and shipped it out here, complete with bug and beetle and earthworm and such that live in the soil; and complete with bush and shrub and tree and flower and weed. So if we find a few insects that arrive as undesirables, that's Life with a capital L."

"I'll accept that. But must we live with pests."

"Let's put it this way, Governor. There are, I grant, a few billion people on Earth who live and have lived their lives out without ever meeting a housefly or a mosquito. These folks are those that live in the big cities, where the place was rebuilt using metal and plastic. These people hold a fairly large percentage of individuals who would toss up their lunch if they were ever given a formal introduction to the sources of that white stuff they pour into their morning coffee. Now, no one of us knows exactly what purpose a boll weevil fulfills, but the little beastie is part of the ecology. And until we find out what he does, he's not to be exterminated."

"In other words, I'm supposed to let the mosquito drink his fill?"

"Oh, not at all. The mosquito and the red-blooded animal have been at war ever since they met. If one lands on you, you may smash her out to the size of a quarter with your hand. But you may not exterminate everything that wiggles by saturating the whole neighborhood with an indiscriminate insecticide."

"I may have trouble in making my good wife understand that mice are beneficial."

"When you get to the mice, Governor, simply tell her that they are prey for the larger birds and other predators. Don't bother to mention that the snakes also dine on them."

"Snakes? Good God! She'd go into orbit."

"You can also explain that once we get Mars Colony completely established, the program is to eliminate things one by one, watching for signs of deterioration as evidence that the item eliminated was necessary for the self-sufficiency of the colony."

"But isn't Mars Colony established? It's been here for thirty years."

"Fifteen by Mars time," said Henderson. "But 'established' does not mean simply maintaining a status quo. Any colony worthy of the name must grow and expand. The original plot of land transplanted from Earth was a monumental payload, but pitifully miniscule according to planetary dimensions. But it contained not only the eggs of the insects and the seeds of the vegetation, it was rich topsoil. Now, we're not precise about the trace mineral content of native Martian surface land, but bug and bee and plant are busily converting the red sands of Mars to the green hills of Earth all along the periphery. Once we calibrate the speed of expansion, then we'll have Mars Colony truly established."

Henderson held up a hand.

"That may need explanation. "Deterioration, to most laymen, means falling hair and failing eyesight and a proclivity toward weakness and illness. Those, however, are gross symptoms. We will determine deterioration by any slow-down of the rate of expansion, and thus nip the degradation before it really takes hold. Now, Governor Laughton, I've got potato bugs to eliminate, and you've got objections to overrule. We'll part friends, and anytime you need something explained, I'm your man."

7. A letter to the Editor of *Speculation Magazine*, September issue:

Sir:

It appears that the idea of some extraterrestrial colony is popular. It will be popular with the adventurous in spirit; the pioneering kind. But it is not the answer to population crowding; it never was and never will be. Those who propose it as such are not paying attention to history. To wit, the opening of the New World did not relieve the population density of Europe, all it did was provide the human race with a wide-open continent in which to increase the total number of humans.

Furthermore, colonization and the implied emigration is a losing battle. There have been suggestions that artificial asteroids be placed in orbit, each harboring 100,000 inhabitants. Now, then, let's pick a nice convenient figure like three billion for the population of the Planet Earth, and assume that by fiat and good judgment the population increase can be made to approach zero, again picking a convenient number, say an annual increase of one one-hundredth of one percent. Then, sir, 0.01 percent of 3,000,000,000 is 300,000, meaning that three such artificial asteroids must be built and launched each year just to keep up with the population increase.

I buy "Colony" as an adventure, or even as a practical experiment that most likely will produce benefits we can't conceive of today. But please, not as a safety valve for the population explosion.

Yours Truly, D. D. McGrew

Your second initial "D" wouldn't be "D for Dan", would it? Your arguments are Dangerous, if not Deadly, to progress. If everyone had always eyeballed everything from the negative side, we'd still be swinging through the trees and throwing coconuts at one another. However, I can't argue with simple arithmetic, so I'm printing your letter to stir the imagination of someone who might think of a way around it.

J.H.C., Jr., Editor

8. Second letter, same issue:

Sir:

Wesley Long, Mr. C. Serpent, and you, in your response to the latter's letter, imply that the minerals necessary to support life are present on the Moon and on Mars, and go on to say that they are even abundant because there is too little (if any) water to leach them away. You have missed the main point, which, unfortunately, resembles

that three-ring trademark once used by a brewer of beer and ale located in Newark. It goes like this:

Circle One: There is no water, or too little water, to dissolve these necessary minerals into a soup that life can thrive upon; "life" in this sense meaning vegetation. Since there is no vegetation, there is no agency to process the available carbon dioxide into free oxygen and stored carbon in the form of hydrocarbons and carbohydrates. If there is no free oxygen, there can be no animal life to eat the vegetation and process it back into carbon dioxide for the plants to breathe, and water to help keep the atmosphere moist.

Circle Two: There is no water, or too little water, to make clouds. If there are no clouds, there can be no rain and there can be no thunderstorms. If there are no thunderstorms, there can be no lightning, and if there is no lightning, water vapor is not combined with free nitrogen to form the various homologs of nitric acid, nitrates, and so forth.

Circle Three: There is no atmosphere on the Moon, and the Mars Probes of the '70s reported that the surface pressure of the atmosphere on Mars is only six millibars, which is only 4.5 millimeters of mercury, not the 100 mm of Hg estimated in the '60s. Now, my book says that water with an overpressure of 100 mm of Hg boils at 37.8 celsius, which is uncomfortably close to the human body temperature of 37.0 C. This would be bad enough, but measured information of six millibars, or 4.5 mm of Hg, means that water would boil merrily at 0.0 celsius. Meaning that any water on Mars must be frozen solid; quite a few of us have watched the experiment in which a vacuum is pulled over a beaker of water until its boiling point drops below the freezing point and the water turns to ice while it is boiling violently.

Now, sir, whatever atmosphere there is on Mars, it is mostly carbon dioxide with a few sprinkles of argon and a spattering of this and that. So that the suggestion that the Colony be moved to Mars because of (at least) a semblance of atmosphere is not defensible. If there is any preference for Mars over the Moon, it is the presence of water in the form of permanently frozen ice, which our colonists can melt and use instead of having to have it shipped in.

Regards, Casey Addabad

P.S. Oh, by "no vegetation" I mean "no vegetation worthy of the name." The primitive lichen and moss on Mars is so low a form of life that it is often difficult to decide whether it is vegetation or crystalline growth.

In other words, it's a case of "No air, ergo no water; no air/no water, ergo no life?"

J.H.C., Jr., Editor

9. Letter to the Editor, October issue:

Sir:

Everyone seems to either be missing an important point or carefully avoiding it. Give Mars enough mass to hold an atmosphere and ship in enough water to fill the lower plains with an ocean—

and it will take quite a few million years for life to evolve. Unfortunately, we human beings haven't got the patience to wait.

What I'm driving at is that life here on Earth evolved in its complicated symbiotic relationship to the present degree of high sophistication over millions of years. Irrigating sterile ground, even loaded with minerals, isn't going to develop the bugs and burrowing insects that mulch the ground into rich loam that is attractive to plant-life, which in turn is food for the animal life.

I therefore suggest that while one crew of engineers is developing some sort of dome to retain an atmosphere, that another crew be assigned to figure out some way to strip a few square kilometers of terrestrial topsoil to the depth of a meter or two and ship the mass to Mars complete with bug-eggs and plant-seeds.

Sincerely, S. McGee

Whoa, Sam! Bring your transplanted plantation down to some useful figures, like one square kilometer in area and one meter deep—and you have one million cubic meters of terrestrial topsoil to handle. Envisioning a program of shipping one cubic meter every day (Including Sundays and Holidays) the final shipment will arrive in twenty-seven hundred years!

Even accepting the more practical figure of a depth to ten centimeters because most subterranean life lives close to the surface, one-tenth of the figures still make it two hundred and seventy years.

J.H.C., Jr., Editor

Having bathed in haste and nicked his chin, Jim Henderson was still dressing when the delegation arrived. He said a prayer of thanksgiving for a wife that had the ability to hold the attention of a cluster of visiting women who apparently had something on their minds. Working his face into a smile of greeting while he buttoned his shirt, Jim finished dressing and went to meet them.

Lois was pouring the iced tea when Jim entered the living room. They all sat and sipped and made small talk, a bit nervously, and Jim Henderson let their nerves rub a bit more raw before he stood up and faced them: "Now, ladies, you seem to have something on your minds. What gives?"

"I am Mrs. Walker, Mr. Henderson. Some of us are fairly new in Mars Colony, but the old-timers assure us that things are all set up and running smoothly. But in the small talk between us, it ultimately came out that we are all concerned about something that few of us really understand. Er—I'm not making myself very clear, am I?"

Henderson smiled. "Clear enough to let me know that you're worried about something. Go on."

"Well, you know, back on Earth, none of us thought very much about things that run. You know, what I mean is that when we wanted light we turned it on. We plugged the vacuum cleaner in the wall socket. We pushed the toaster down. We breathed conditioned air, cooled in summer and warmed in winter. Water came from the

faucets either hot enough to wash in or cold enough to drink."

"And you lack these things on Mars? Is that it?"

"No, of course not. It's just that back on Earth no one gave half a thought to where the power was coming from."

"And—?"

"And we find here on Mars that there are atomic energy plants all over the place."

"You're quite right. There are. So what's the problem?"

"Mr. Henderson, back on Earth—we looked it up—about one-quarter of the power used comes from atomic energy. But these plants are all far away, far out of city centers where nothing much would happen to the population if an accident were to occur."

"Mrs. Walker, I am not about to read you Lecture Number Eight about nuclear power plants and their safety measures. I am going to wonder, aloud, how long it is going to be before the lay person ceases to equate 'nuclear accident' with devastating explosion and takes to the hills, writes Congress, and starts a petition whenever plans are drawn for a nuclear plant."

"Well, they *do* have accidents, don't they?"

"In the Seventies and Eighties of the last Century, there were some cases where radioactive stuff was spilled, but it didn't get away. Most of the bad publicity came from fish kills caused by sudden change in water temperature when the plant was shut down—but we can hardly expect that here, can we."

"But there *are* fish in the lake and river."

"Mrs. Walker, there are indeed. But on Earth, they use the water to cool the nuclear plant. On Mars we can use the heat. So that's how Mars Colony keeps warm."

"But why must they be strewn all over the place? There isn't one spot in the colony where a half dozen of them can't be seen."

"The word is not 'strewn' but carefully placed in a calculated pattern to hold the boundary in the most favorable shape."

"But must we rely on nuclear power for everything?" complained Mrs. Walker.

Henderson smiled. "Look," he said, "I'm neither going to argue with you nor am I going to come down with a flat declaration that what we're doing is the best way to do it. I'm going to point out the facts of life and let you do your own reasoning. OK?"

"I suppose so. Go ahead."

"Fine. Now, after we except nuclear power, the main sources of power on Earth remain natural or fossil fuels. Well, on all Mars there isn't enough water to make a small river, let alone drive a hydroelectric plant. Mars has never gone through a carboniferous period, so we can neither mine for coal nor drill for oil. That takes care of the three main sources other than nuclear power."

"But how about solar power?"

"Solar cells remain expensive and they remain disgustingly inefficient, so that the dollars per kilowatt hour would make your hair stand on end. Furthermore, the sun delivers about point-four-five of the power it delivers to Earth, so that to collect the same amount of power, the cell must be about two-point-three times the area of the one on Earth. The same holds true of the other energy-collecting systems.

"Now," he went on, "since a fleet of spacecraft built as coal bunkers and oil tankers is about as practical as running a pipeline to Earth, uranium is the only answer. Think, now, when Mars Colony was in the building stage, they did ship in enough enriched uranium to erect the first nuclear plant. And one of the first things the first colonists did was to prospect for uranium—and they found it. From that time on, shipping was concentrated on the necessities for survival since Mars Colony had its own local power. I'm sorry that nuclear plants make you ladies nervous, but as the gambler said, 'It's the only wheel in town!' "

10. A letter to the Editor, November issue:

Sir:

Mars Colony seems to be growing smaller and smaller. Ultimately, it will approach a size where the area can be domed over by modern engineering methods. But don't go too far. I am hazy on the present figures, but I dimly remember reading in the distant past that it required about six acres of land to support one adult. Now, the old-fashioned acre is 4,047 square meters; the modern football field, 50 by 100 meters, adds up to 5,000 square meters. (The difference be-

tween the old and the new football field is small enough to re-lay the lines without rebuilding the stadium.)

So, stripped to the depth of ten centimeters, one football field equals 500 cubic meters, and "six acres" adds up to 3,000 cubic meters. I now suggest that the price of admission to Mars Colony be that each colonial bring along his own 3,000 cubic meters of topsoil. To take care of local expansion, for each newborn to the colony, one senior citizen will be declared surplus, thus stabilizing the population.

With fiendish glee,
George O. Smith

Be careful, George, one might come to the conclusion that you have no faith in Mars Colony. I hope you do have faith in the Hereafter; anyone who is old enough to remember the size of an "acre" is certain to be the first one to be declared surplus.

J.H.C., Jr., Editor

11. Letter to the Editor, December issue:

Sir:

I don't think George O. Smith has to worry. The more that's written about "Mars Colony" the less feasible it appears. Give it some more thought and it will disappear.

I'd suggest that if a colony is in order we colonize the Amazon Valley—at least we won't need air and water, purveyed by filling stations with pumps labeled "Regular" and "High Test"!

I'd further suggest that you start bending your editorial effort toward finding another hobby to ride; the Mars Colony horse is dying fast. How about looking into that "Magnetic Hill" that's turned up on the Massachusetts Turnpike?

Sincerely, Phil Anders

Making a real investigation of that "Magnetic Hill" is not Speculation Magazine's *dish of tea. The so-called "Magnetic Hill" turned up about the time that improved roads and pneumatic tires made the ride smooth enough so one could observe the optical illusion of being "pulled" uphill.*

Being a city boy, I'm a bit undereducated in the farming bit. Someone who knows might tell us about hydroponics; it might be the trick to beat that 3,000 steres of topsoil. Or am I wrong?

J.H.C., Jr., Editor

12. Letter to the Editor, *Speculation Magazine*, January issue:

Sir:

Hydroponics is indeed a means of growing quite a crop in a small place.

However, may I point out that in the process of hydroponics, one carefully adds the chemicals and minerals necessary to do the growth of the plant in stochiometric quantities—obtained in C.P. Grade from some supply house—and then afterward one throws out the inedible part of the plant. In blunt words, the process doesn't make the colony self-sufficient unless the colony also has processing plants to extract the useful chemicals from the inedible parts of the plant for re-use.

Regards, H. A. Sceede

I'm sorry I asked. Sometimes it is better to remain in ignorance than

to face knowledgeable disappointment. *J.H.C., Jr., Editor*

13. Letter to the Editor, *Speculation Magazine,* February issue:

Sir:

The big flap that started after I left to visit the kids in Florida probably makes you shout with glee and gusto. I have never known an editor alive (or dead) who doesn't (or didn't) leap upon his (or her) desk and cheer when the "Letters" column began to show signs of a running controversy.

But while drinking my son-in-law's bourbon (all the corn doesn't appear in *Speculation,* you know) it occurred to me that when the human race wants to get something done, the human race finds some way to do it. Let's compare Mars Colony with the Great Pyramid.

Using rounded guesstimated figures because splitting hairs doesn't change the magnitude of the undertaking, the Great Pyramid is built of some 2,250,000 blocks of stone about six or eight metric tons each. According to Herodotus, the thing was built in 20 years. Now, assuming a ten-hour day and a six-day week for 20 years, the total time is 3,774,000 minutes. Divided by the number of blocks, we find that one such stone block must be processed every 1.664 minutes!

And by "processed" I mean that each block must be cut from the living rock in the quarry, shaped, hauled to the site, and put in its proper place. Once every minute and forty seconds!

Make it a hundred years in the building and the per-block processing time makes it one every 8.32 minutes.

So unless someone wants to postulate a batch of interstellar travelers, witchcraft, or mystic powers, one must assume that these ancient engineers built the pryamids without blasting powder, pneumatic drills and cutters, or mass-moving machinery.

So if, by hand, they could cut, shape, move, and place about eight million metric tons of solid rock, what's a few lousy hundred thousand tons or so?

We can do it when we want to!

As Ever, Wes Long

We all agree—but when will we want to?

J.H.C., Jr., Editor

14. Letter to the Editor, *Speculation Magazine*:

Sir:

Interest in Mars Colony continues to diminish despite Wesley Long's rebuttal to those who think the mass involved is beyond human capacity.

The idea must not die. It must be kept alive, if for no better a reason than that given by mountain climbers: "Because it's there!"

Your name is picked because you are a member of a family of "First Fandom" which is an organization that refuses to die despite the fact that its founding members have been editing and printing fanzines on asbestos paper for two or three generations. Five bucks, and you are a founding member of "Mars Colony." We've inveigled Kelly Freas III to concoct a mem-

bership button; he has responded with a stylized but unmistakable map of Mars, encircled with the motto: *Ad Martia Per Aspera.*

Send money—not praise!

It's lousy Latin, but quite understandable!

J.H.C., Jr., Editor

"Morning, Pete. Wearing the Agrarian Hat today?"

"Half and half, Jim. The other half is Ecology."

"That's why I came. It's nearly time for the monthly report covering the growth rate. How are we doing?"

"Rather better than we expected. Oh, it's going to be a long, long time before the perimeter grows faster than we can cultivate the ground. But it is spreading faster than the academic calculations suggested."

"Got a guess as to why?"

"Just a guess. I think maybe they were a bit too pessimistic about deleterious effect of the iron-rich Martian soil. Or possibly we don't know as much as we profess to know about plant life, its growth, and the effect of those trace minerals."

"Probably a bit of everything. Just remember, to make a transistor, one must contaminate the crystal with an atom of something that doesn't belong for every fifty million atoms that do."

"Yeah, And I remember reading about a flock of sheep that were moved from one valley to another and promptly began losing ground in the baby lamb population. Seems the other valley had a trace of some compound that had cobalt in it, that the new valley didn't."

Together, they walked outward, away from the center. Had the operation been random, it is more than likely that the terrestrial vegetation, foreign to Mars, would have tapered from the tall and healthy where the transplanted topsoil was to the shorter and more delicate where the mixture of soil lost the terrestrial to the gain of the Martian. Possibly, in much the same way that tree and plant taper off as one ascends the mountain through the timberline. Strangely, tree and plant in that area are nicely formed, although small and delicate, as if proving the theory that the more fit are more likely to survive.

But as it existed in Mars Colony, the vegetation tapered out in bands. Beyond the visibly thriving farmland was a field of buckwheat which grew out to a line that had been surveyed and still retained traces of the original borderland. Beyond the buckwheat was a band of standard grass, unmowed, the kind developed for the rough on a golf course. Another two hundred meters and the hardy strain of grass stopped in favor of two hundred meters of tilled soil with tiny points of green showing.

Beyond the tilled soil lay the red sands of Mars, dark with its admixture of topsoil nearby and fading rapidly into the more familiar Martian iron-red landscape to the horizon.

In the newly turned area, small boxes were held above the surface by a few centimeters, supported

on thick plastic spikes thrust into the soil. The boxes were topped by small antennas, each labeled with a cryptic code-system. It would have been evident, even to the complete layman, that this was some kind of elaborate monitoring system; that the thick spikes carried sensors for this, that, and the other condition of the soil, and that most likely each box was interrogated by some central data processing equipment in a regular pattern and the information collected was telemetered to an information-evaluating computer that correlated the data and presented it to the human race as a readout.

One might suggest that Jim Henderson could learn more about the condition of this encroaching soil back home at the control center, but this is not so. Information-gathering equipment may be the best there is, but it can be precise and error free only to the capability of the equipment. That is, it cannot collect information that it was not designed to gather. Therefore the slow and sloppy, error-prone, but versatile human can collect information that is beyond the scope of the lightning-fast and neat, incredibly precise, but unimaginative machine.

"Moving fine, I see," said Henderson.

Pete Wilkins nodded. "Not only that, but I think we've proved one puzzle conclusively."

"Oh? Which of the ninety-seven?"

"The question whether perennials—ah—*perren*—by the warming days of spring or by the longer hours of daylight. Yeah, I know that this has been proved by experiment on Earth, but no one could be absolutely, positively, definitely certain until we planted stuff on some place that had approximately the same diurnal period but a definitely different annual period."

Jim Henderson nodded. "I was willing to accept the longer hours of daylight over the increasing temperature of spring," he said. "The planners who insisted that Mars Colony should be on the equator for the benefit of equatorial temperatures and climes were talking through their ignorant hats. At zero, it's cold; below zilch it makes little nix whether it's minus sixty or minus eighty in the middle of the cold hours of the morning. So they put Mars Colony where we'd have seasons—summer, cold as a polar bear's nose; winter, colder than the polar bear's mother-in-law's affection."

"Well, it worked, and I'm certain the data will bear me up." Pete looked at Henderson. "When do we move out again?"

"I'd say sometime next autumn. But ye olde computer will tell us precisely when we break new ground." Henderson walked out to the edge of the freshly-tilled section and took a handful from just outside the turned-over part. He felt of it, smelled it, and then took out a pocket microscope and examined it. "Doing fine," he said. "Wind, water, rain, atmospheric pressure, and just plain old warmth are spreading us out at a neat rate."

Pete Wilkins chuckled. "Yeah," he said. "So we *contaminated* this itty-bitty pinpoint of medically sterile Mars with terrestrial life—and like the pinprick of the vaccination needle, we're going to take over the whole works."

15. Excerpt from an editorial (draft) written for *Speculation Magazine:*

I have been called blind and a lot of other names, but I still maintain that the so-called "Magnetic Hill" is, and always has been, an optical illusion. It is found in areas where building, telephone poles, and other man-made structures are rare, for such edifices are invariably erected according to a plumb-line, which indicates the true vertical. The driver has been on a long, most likely winding road that slopes downward on, let's say, a two percent grade plus or minus as little as modern road-making can permit. The lack of a true vertical reference lulls the driver and his passengers into the illusion that they are running on the level. At the bottom of this almost flat hill, the grade changes from two percent to one, giving the motorists the impression that they've started "up."

Well, armed with compasses, a couple of cast steel cannon balls borrowed from the Civil War Museum, and three softballs swiped from the high school gymnasium, your Editor went to Massachusetts and tried Magnetic Hill for anomalies.

Dear Reader, the compasses did not show any noticeable variation in the area, and the softballs rolled "uphill" (if you'll pardon the expression) as fast as the steel cannon balls.

So if we're going to Speculate, let's not waste our time on phenomena that are as simply explained as "Magnetic Hill."

J.H.C., Jr., Editor

Helen Laughton said to her husband, the Governor, "Darling, I'm getting used to the bugs and the mice since I have to get used to them. But one thing I really miss, and it strikes me that these Mars Colonists and their ecologists didn't do a proper job."

"And what have they missed, my dear?"

"Well, they transplanted everything that goes into a balanced ecology, according to their own words. But have you noticed that among the various birds, there are no songbirds?"

"Well, my dear, as Jim Henderson might say, 'You can't win 'em all!' You see, Helen, songbirds are migratory. And even if we had a Mars Colony Two in the south of Mars, they couldn't get there because the natural atmosphere outside of the boundary is too thin for them to fly through, let alone breathe."

"In other words, Mars is to be without songbirds?"

"Oh, Mars will have them someday. Once Mars Colony is officially thriving, there will be a Mars Colony Two, and then it will be necessary to connect the two with boundary, and that will enable the songbirds to migrate."

The automobile approached the sentry's booth along a rough macadam road. He showed the sentry his papers, and the sentry, reading them, smiled and nodded. "March on, sir. And I read *Speculation* every month."

"Nice to hear it. I guess, then, that you know what's been going on."

"Yeah. Gave us all a chuckle to read about everyone running all over the place, looking at everything but the evidence. The boundary is marked, so be prepared for a bit of a sensation for a couple of hundred meters."

The sign was in four languages on either side of the road that ran straight and true and level across a flat plain far from any evidence of civilization other than a squarish utilitarian-looking building in the near distance where the road obviously ended:

WARNING!
THIS MARKS THE BOUNDARY OF THE MAGNETO-GRAVITIC FIELD GENERATED BY THE VON TUYL GROUP OF THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY. BECAUSE OF THE CONFIGURATION OF THE FIELD, "UP" AND "DOWN" WILL APPEAR TO BE WARPED FOR THE NEXT HALF KILOMETER. DRIVE CAREFULLY. DO NOT TRUST YOUR EYESIGHT NOR ANY OTHER OF THE USUAL PHYSICAL SENSES OF ORIENTATION.

J.H.C., Jr. drove cautiously forward, wondering what to expect. Then with little warning, the road that stretched as straight as an arrow forward bent down as if the terrain were a rubber sheet and someone had pulled it down in the middle. The car moved forward, following the down-curve of the road, and the Editor of *Speculation Magazine* braked to slow it.

He continued forward, stifling the impulse to come down hard on the brake because his whole physical sense told him that he was approaching ninety degrees vertical and would soon plunge into the bottomless pit where the road ran toward the squat building that still appeared on the horizon, almost dead straight down.

Conversely the seat of his pants and the pressure of the seat cushion against the lower small of his back told him that he was descending on a grade no greater than forty-five degrees, while his feet were reasonably firm on brake and throttle.

It was as if the "downward" line of gravity were curved. J.H.C., Jr. was not Editor of *Speculation* without a technical education or the ability to think and reason clearly, and he also had the ability to start with a cockeyed premise and build a pseudologic around it. If the gravitic field were warped in a curve, it must lie, he reasoned, normal to something at either end. Probably normal to the surface of the ground at the lower end, and normal to some curve above.

And as he fought his impulses to stop, the road slowly rose from its downgrade until everything was sensibly horizontal again.

Only one thing was strange. His ears popped as if he'd come down

too rapidly from aloft in an unpressurized airplane.

The group from MIT were waiting for him with knowing smiles on their faces. One of them handed him a drink that looked like water. It wasn't. It was ethanol, absolute, laboratory grade, cut four to one with distilled water. "Most newcomers need that after they've passed the boundary," explained the friend. "What do you think of it—the boundary, I mean?"

J.H.C., Jr. said, "It explains the moving sidewalk along Mass Avenue in Boston, and the Magnetic Hill along the Turnpike."

"That's why we got moved out to this forsaken desert. Snakes, gophers, and the like don't seem to mind climbing hills that aren't there."

"But how come that curvature sensation?"

"Oh, that's because we've been experimenting with the shape of the field. Using a single generator, the field is a sphere around it. Use two, and the field becomes an ellipse of revolution with the two generators at the foci. But a guy walking along the major axis feels that 'up' becomes up only at dead center between the foci. So we've installed enough generators to flatten the field so that it more resembles a bagel. As one enters the field along the level, the gravitic field is curved along the rim, but becomes sensibly oriented slightly inside."

"Got it."

"That isn't all. We can reverse the field. Got any idea what that means?"

17. Editorial in *Speculation Magazine* (the closing paragraphs):

Now, of course, no one (not even Congress) can repeal the laws of thermodynamics, so launching a spacecraft still calls for the same expenditure of energy. But the von Tuyl Field means that the spacecraft need no longer carry its own fuel for other than maneuvering; the energy can be "burned" in a nuclear reactor on the launch site to negate the Earth's gravity to the point where a pipsqueak of a rocket means takeoff.

(We might reverse gravity, but that would launch a column of Earth's atmosphere along with the spacecraft, and the ecology bugs would howl!)

However, I want to point out that indeed, Mars Colony Is Not Dead!

"No, dear, you don't quite understand. The potato bug is the natural predator for the potato plant; the bug keeps the plant from taking over the planet. Both plant and bug were few and far between and well-balanced until humankind not only tried to replace the bug as natural predator, but also cultivated the potato, creating an excess that, by nature, led to the proliferation of the bug. Thus, you see, the potato bug preys on the potato plant, and humankind preys on the potato bug."

A large, round, wet drop of rain hit the ground. "Rain," he said needlessly. "What's for dinner tonight?" ■

Old truism: "A statesman is a politician who has died."

the prince in metropolis

GORDON EKLUND

GEORGE SCHELLING

When word leaked out in hushed tones from City Hall that County Chairman John Logan was perhaps dying, a hundred reporters crowded uninvited into the tiny press room directly adjoining Logan's private office. Here the reporters waited impatiently, sipping coffee from plastic cups, swallowing stale doughnuts, making loud blunt jokes among themselves. An air of expectancy swept the room but also a sense of improbability. Johnny Logan dying? One reporter suggested that Logan would never agree to die till an unbiased survey of the dead determined once and for all that there really was a heaven. Another agreed: Logan wouldn't dare kick off till he found out how the people of the city felt about the idea. Done too hastily, dying might cost some votes at the next election.

It took an hour of waiting before a trim young man emerged from the chairman's private office, as the thick iron door creaked noisily on its hinges. Past this door was a second, identical one and past that, according to the few experienced reporters who really knew, sat Johnny Logan. The two doors together acted as an airlock, and never once in thirty years had Johnny Logan been forced to step outside either of those doors to breathe the tainted air of the city he ruled.

"It's my pleasure to report," said the trim man, Logan's personal deputy, "that Chairman Logan is making considerable progress toward full recovery." The deputy read from a creased sheet of thin paper. "The doctors have assured me in a day or two the chairman will be on his way home."

"Oh, bull," said a sharp voice.

The deputy, shaken, glanced up. "What? Who said that?"

"I did." One reporter stepped boldly forward. "Every man in this room knows Logan doesn't have a home. Who wrote that crap for you? It wasn't Logan himself, was it?"

"No. No, of course not. I—"

"Then why don't we just cut out the bull? Either Logan is dying, or he ain't. Which is it?"

"No," the deputy said hastily. "No, of course he's not dying."

Naturally, not one reporter believed a word he said.

For three days after that, the deputy continued to insist that Johnny Logan felt fine, but the growing pallor of the deputy's complexion conflicted with his words. By the fourth day, most reporters believed the last moment was drawing near. To them Logan was no longer simply dying; he was dead.

The deputy pleaded: "Chairman Logan is making dramatic progress toward full recovery. The moderate pain he has been experiencing has now largely been alleviated . . ."

The reporters, ignoring this, each in his own fashion recalled the

Johnny Logan he had known. The older ones remembered how you could stand in his presence for hours and never notice that he had no legs. But the hands: those you noticed first off, the silver shining hands, fingers clicking, clacking, constantly in motion. Logan's head sat twisted upon hunched shoulders, so that the eyes never quite faced you, always seemed turned toward a corner, that ageless, ghostly pale face that never shifted expression. And the bow tie. You never noticed how he dressed except for that tie—the alternating red and white stripes—and some said he'd worn it since the day he was born.

Others recalled the office itself. The room measured forty feet by twenty, but machines occupied two-thirds of that space: teletype and telephone, television and radio, tridee viewer and mobile computer; and the other machines—the ones nobody quite understood—and the wires flopping, twisting everywhere. And there were the files, too: microfilm and videotape, books and magazines and newspapers, reams of typewritten copy, mimeographed pages, scribbled notes. That left only the chair, where Logan sat, the high revolving chair like in an old-time barbershop, the legless little man curled like a cat in the deep, cushioned seat.

But few reporters had ever ventured this far. Most recalled no more than what they'd heard or read. For them, Johnny Logan was simply the Prince, the man who ruled this city. For thirty years he had reigned. Now he was dead.

The deputy droned on.

"I've got to see Johnny." The little man emerged from the mass of reporters like a cork from a bottle top. He headed straight for the thick iron door. "I've got to see him now."

None of the reporters could recall seeing this little man before.

"Hey! Hold on!" The deputy leaped to intercept the man. "You can't go in there."

With a hand on the door, the little man paused. "I'm Ned Walker. I want to see Johnny."

"Chairman Logan never sees anyone."

"He'll see me." Grinning suddenly, Ned Walker backed off a pace. "Get in there and tell him it's me."

"He knows you?"

"Ned Walker. Got that name? Tell Johnny that Ned Walker has come to say good-bye."

To the bewilderment of everyone, the deputy obeyed. He opened the heavy iron door and went through.

The silence which had gripped the tiny room dispersed in sudden hubbub. A veteran reporter was the first to reach Walker's side.

"What's your connection with Chairman Logan?" the reporter wanted to know. "Why is it important you see him now?"

"He's dying, isn't he?" said Walker.

"That's not what the man just said."

Walker laughed at that.

"But exactly who are you?" the reporter pressed, as his colleagues gathered close to listen.

"An old friend," said Walker. "Johnny and I—"

The deputy's head jerked abruptly past the half-open iron door. "Chairman Logan will see you now, Mr. Walker."

"See?" said Ned Walker, winking at the reporters. "What'd I tell you? Johnny and I are old friends from way back."

The boy was nine years old when his dog disappeared and he went looking for it. At that age the boy was old enough he should have known better, but his mother worked all day and his father had disappeared years ago, so there was nobody in authority to confide that a boy who lived in one specific neighborhood should never try venturing into the next.

It was a sweltering day. The boy walked one block, calling the dog, then walked another.

Crossing Wade Boulevard, where the neighborhood ended, he went on.

They caught him near the next corner. Strangely, he never remembered any of their faces—even if they had faces—but their voices he never forgot. Thick gravelly voices like the sound a truck makes early in the morning driving down an alley littered with broken midnight glass. Two grabbed his arms, while the third hefted his legs. As they carried him away, the boy screamed.

"He doesn't know what he's doing—listen to him cry."

"He knows. Sure, he knows. He's a spy."

"Right. If he wasn't, why cry?"

"We'll fix it so he stops crying."

The trains never whistled or tootled the way they did in the movies. All they did was run right past going *chum-chum-chum.* One, then another behind it, pushing the air, turning it hot like summer wind. They held him up high so that he saw the trains passing. Every eighteen seconds one flashed by but he couldn't see any of the people in the windows or the ones standing in the aisles with their books and papers. He remembered these people from the time his mother had brought him downtown to see a doctor.

"We're going to toss you under the next train," they said.

"Listen. Hear it coming? It'll kill you dead for sure."

"No, it won't. It'll hack off your legs like a big butcher knife and you'll lay there bleeding with no legs."

He couldn't seem to ask them to stop. He quit crying but didn't speak.

They went *one-two-three* and

swung him over the tracks. One on each of his arms and the other holding his legs. He kicked weakly. *One-two-three* and the train swept past going *whoosh.* One-two-three but they didn't throw him.

"One-two-three." The train drew near.

This time he kicked. It was a mistake. For a split second, he floated in the air. Then he hit. He felt the searing heat of the steel tracks and rolled and heard a roaring raging noise and screamed and heard them screaming and then couldn't breathe.

But he wasn't dead.

His legs, his hands: sliced off like a butcher cutting meat. He lay bleeding without hands or legs when the curious neighbors finally came and found him.

Without legs or hands, Johnny Logan lay upon an unmade cot in the tiny living room of the small apartment he and his mother shared on the ninth floor of a stark gray public building. For nearly ten years, Johnny had lain here. Once a month, he rode a cab to the clinic, but the doctors only said he was looking well and sent him home again.

Because of the danger of fire, Johnny's mother left the door unlatched while she worked. Twice Johnny had watched powerlessly while burglars ransacked the apartment. There was little worth stealing.

The door popped open and a boy came inside. He carried a big cardboard box in his arms and sweated from the eight-story climb. "I did it," the boy told Johnny. He dropped the big box and opened the lid a crack. "Want to see?"

"Show me, Ned. Either show me or get out."

"Sure, Johnny. Sorry." Ned hastily removed a pair of hands from the box and held them so that Johnny could easily see them. Each was made from glistening steel and came equipped with four jointed fingers and an offset thumb. Ned stepped forward. "Let me see your wrists, Johnny."

Johnny held out his stumps. Ned attached the steel hands to both wrists, then took the long wires that sprouted from the hands and strung them around Johnny's neck and shoulders so that they dangled behind. Then Ned removed two small transformers, like those used to operate electric train sets, and using heavy tape, attached the transformers to Johnny's hips. He fastened the wires to the transformers, then came around and stood in front of Johnny. "Try it," he said. "See if your elbows reach. Press the buttons on the transformers—all of them."

Johnny lowered his elbows till the bones touched the transformers. Pushing gingerly, he watched the steel hands. On both, the fingers jerked open.

"Now, again," said Ned.

Johnny pressed. The fingers snapped shut into tight fists. "Again?" he asked.

"Sure," said Ned.

Johnny pressed and the fingers opened.

"You've got the idea," Ned said, "but now you'll have to learn the exact amount of pressure to apply. See, there's five buttons on each transformer, one for each finger. It's easy, but it'll take practice."

Johnny couldn't resist pressing the buttons again and again. He enjoyed the sensation of seeing his new fingers move. They twitched as if possessing a real life all their own. "OK," he finally said, "but I still don't get it. The doctors told me these things cost a fortune each. How'd you ever get them?"

"That's because I did all the work myself," Ned said. "Anything to do with electronics"—he tapped his chest—"and I'm your genius."

"But even the parts—they must have cost—"

"A lot, right."

"And you bought them?"

"With stolen money. I robbed a store. It was scary but easy. I don't look like a thief."

"You're not a thief. And I'm no friend of yours. Why should you do this for me?"

Ned thought, then finally replied. "Because without those hands, you'd be stuck here the rest of your life. Because underneath it all, you and I are just the same, Johnny." In all the months he had known Ned, Johnny had never seen him so animated. "Because when I'm helping you, I'm also helping myself. We don't belong down here, Johnny. We're both too smart. We deserve to live uptown. We have that right."

"These'll get us uptown?" Johnny said, clicking the steel fingers.

"They're a start. But I think I know the rest, too. I think I've figured out the big secret."

"Then tell me."

"It's giving them what they need. That's all—the secret to worldly success. Find some people and give them whatever they need. Do that and you can't lose."

"Is that what these hands are, Ned? Are you giving me what I need?"

"I told you it was a start."

Johnny Logan grinned.

One year two major candidates competed for the job of city mayor. The first of these, the former chief of police, centered his campaign around the figure of 19,345—the best estimate of the number left dead in the recent months-long Dark Uprising. It was the chief's boast that he had built this figure largely on his own and would gladly do it again if necessary. His opponent could in no way match this claim. The election looked to be open and shut. Yet the chief ran hard. There was no complacency in his makeup.

One bright afternoon the chief

appeared to help open a newly rebuilt shopping plaza. The occasion was festive, with food, drink, music, and dancing. The chief stood upon a high platform and faced the crowd. Beside him was a young man in a wheelchair. The young man had two steel hands and no legs.

"This is what occurs," said the chief, indicating the young man, "when the natural rule of civilized law is subverted by immoral beasts. An innocent bystander like this boy, a college student with mother and brother and sister, slashed down in the prime of life. Say a few words to these people. Explain to them how this barbarous act occurred."

The young man spoke to the crowd of knives, pain, horror, and anguish.

The following day, the chief and the young man again appeared side-by-side. The day after that, too. The chief was running very hard indeed.

Then it was two days before the election. The young man met with the chief. There was a third person present, a scrawny youth with a sad, twisted smile.

The chief told the young man in the wheelchair, "Goddamn it, Logan, I won't be blackmailed. I can have your throat slit, your body dumped in the lake."

"You're too late for that," Johnny Logan said. "If I'm not there to say no, the papers get my story tomorrow. I've got hospital records, doctors' reports, the whole thing. Hell, they can check their own files. When it happened, I made page four."

"So what?" said the chief. "So you lied to me? How was I supposed to know?"

Logan smiled. "I thought you wanted to be mayor. If the story comes out, then you're either a liar or a fool. Such men do win elections, but not invariably."

"And what do you know about elections?" the chief said.

"That's what we want to show you." The scrawny youth spoke for the first time. "We want Johnny to be given the job of leader in the eighty-ninth ward."

"The eighty-ninth?"

"That's right," said Logan.

"But we haven't carried forty percent there in forty years."

"We want to change that for you."

The chief laughed, unable to conceal his relief. "Then you're both a couple of fools. Hell, I'd have given you a hundred thousand and paid your way to Hawaii."

"And what would I do there?" Logan said coldly. "Would I swim? Surf? Fish? Lie naked under the sun?"

The chief lost the election, but in the eighty-ninth ward, his party carried a clear majority of the vote.

Two years later, a pale twenty-seven-year-old man, with steel

hands and no legs, was chosen county chairman. When wheeled into his new office, the chairman went straight to the wide window overlooking the lake and said, "I want this bricked up today."

Turning, he demanded that a special set of double doors be installed between his office and the adjoining press room. "And I want it fixed so I have my own air supply in here. After twenty-seven years, I want to taste clean air."

Three men soon joined the chairman. Two bore a high, revolving chair, which they installed in the center of the room. After these men left, the third man remained behind.

"I've ordered everything we need," Ned Walker told the chairman. "I can start work tomorrow."

"Good," said the chairman. "Now give me a hand."

Ned lifted the chairman and carried him to the seat of his new chair. "How do you like it?"

"It's all a man could want—if he was me."

"It's a start," said Ned.

The chairman clicked his steel hands. "No, it's the end. The battle's won. I can't lose now."

Ned shook his head. "But we don't even hold ten seats in the city assembly."

"That doesn't matter. What matters is knowing the key words. Like jobs."

"Municipal jobs?"

"Exactly."

"But that's Civil Service."

"Right. So I have to control Civil Service."

"But you can't do that. It's all by test, examination."

"Not if the tests are never held. It's an old trick. It means owning no more than a half-dozen men at the top. When an opening occurs, I appoint a temporary job holder till the tests are held. For twenty years, as long as the man does what I say, the tests are postponed. That way I'll always have two strokes in my favor. I've not only hired the man, I can fire him at will."

Ned shook his head. "You seem to know what you're doing."

The chairman nodded. "That's why I've got you on my side, Ned."

"Why me? I don't know a damn thing about politics."

The chairman grinned. "But your machines do."

For a week after that, at odd hours, several dozen tons of electronic machinery arrived at the office of the county chairman. The equipment was immediately taken into the private room occupied by the chairman himself. From behind that door, for many days and nights, strange humming, whirring, whistling noises could be heard. Hammering, too. The buzz of electronic gadgetry.

At last, Ned Walker turned to the chairman and said, "I'm done, Johnny." Ned indicated the mass of machinery surrounding him.

"That's everything you asked for—finished."

"Then show me," the chairman said, from high upon his revolving chair.

"Now?" said Ned, showing his exhaustion.

"Now."

"Then give me a question. Anything that might come up in your work."

The chairman stared curiously at the seat of the chair, where a half-dozen intricately woven wires disappeared into the upholstery. Both chair arms were speckled with dials, buttons, and levers. "I want to know," he said, "if dog-owners should be allowed to keep their animals inside the city core."

Ned moved slowly, surveying the fringes of the room, stepping from machine to machine. Halting before one, he tapped a typewriter keyboard. "OK," he said, turning to face the chairman, "now pull the third lever on the left arm."

The chairman obediently pulled the correct lever. The machine in front of Ned surged to life, chugging and glowing. A moment later, a series of figures appeared on the wide television screen suspended above the barber chair. The chairman read:

YES 62%	YES 33%	YES 40%
NO 27%	NO 38%	NO 35%

"Well?" said the chairman.

"It's really simple enough," Ned said. "The question is the one you asked. The first column represents the responses of all dog-owners, the second, non-dog-owners, and the third is the combined total."

"It's not enough," the chairman said. "Give me the figures on the city core only. Can you do that?"

"Sure." Ned went to the machine and tapped the keyboard again. "Pull the same lever."

The chairman did, and the screen glowed:

YES 95%	YES 34%	YES 62%
NO 4%	NO 40%	NO 25%

"Well, that answers it," the chairman said, grinning. "We let the people keep their damn animals. Don't you see it, Ned? In the core city, the dog-owners want very much to keep their animals, while those without dogs are about evenly split. What that means is, if I take away the dogs, the owners will hate my guts. If I don't, nobody will get too mad. It's just what you've always said, Ned: I've got to give them what they need."

"I can see it now, Johnny."

"Sure, but it's got to be so I can trust these figures completely. I want two hundred men asking questions day and night. Once I've got Civil Service under control, I'll double that number."

"All those people, just to ask questions?"

"I've got to have the right answers, don't I?"

Although no one knew it yet—not even Johnny Logan himself—a prince had been crowned. The city was his to rule.

It was past three in the morning when Ned Walker stepped through the double iron doors and entered the Prince's throne room. A hundred separate lights glowed and flickered in the tiny room; dozens of machines hummed and whistled. The man in the barber chair stirred. "Something up, Ned?"

"The chief of police called. I don't know why he thought it was important, but something ugly happened in the core tonight. Three men were attacked in different locations and all had their limbs severed."

"Did the chief give you any names?"

"As a matter of fact, yes." Ned removed a slip of paper from a pocket.

"Are these the ones?" The Prince pointed a steel fist at the television screen above his head. Three names glittered there.

Ned glanced at the paper in his hand. "Good God, Johnny, how did you know—?"

"Because," said the Prince, "I ordered it done."

"You? No. Why would—?"

"Have you forgotten these, Ned?" The Prince showed his steel hands. "Or these?" He indicated the place where his legs should have been. "Your machines are wonderful tools, Ned. They can answer almost any question known to man. For more than twenty years, I've wanted those names. Now I can finally rest."

Ned stepped very close to the elevated chair. "You used my machines for that? For murder?"

"The men aren't dead."

"But you used my work?"

"Of course, Ned." The Prince never let his gaze waver. "Isn't that why you did it? So it could be used?"

The Prince, perched high atop his chair, watched with interest as a young party deputy entered the room and shuffled an armload of papers.

"Forget those," the Prince said. "I want to know about Ned Walker."

"I'm afraid there's nothing new to report, sir," the deputy said hesitantly. "I know the chief has five hundred officers searching the city, but Mr. Walker just checked out of his hotel at midnight and hasn't been seen since."

"Damn!" The Prince slammed a steel fist against the soft cushion of his chair. "One man can't just vanish."

"The chief believes he may have left the city."

"Then how—and where?"

"The chief believes Mr. Walker may not want to be found."

"The chief is a damn fool." The Prince glared at his retainer. "Ned

Walker was the best friend I ever had. I took him from nothing and made him powerful." His voice quivered with emotion. "I want him found immediately. Hear me?"

"Yes, sir." The deputy backed fearfully toward the iron door. "But there is the building contract decision. Both Mr. Carizini and Mr. Thesiger have called me—"

"The hell with both of them. Ned Walker. I want him found."

"Yes, sir." The deputy hurried out, shuffling his papers once more.

"Bastard," said the Prince, leaning deeply back in his chair. What could have happened to Ned? Murder? Kidnap? Accident?

And this contract dispute, too. The decision was too crucial to be safely ignored. The Carizini Company, big and rich, was a long-time patron of the other Party. Thesiger, though an old supporter, was a little guy in comparison.

The Prince wanted Ned Logan's help. He wanted him here to run the machines and evaluate the results.

But Ned was gone.

And a decision had to be made.

Reaching tentatively out, the Prince began pulling levers and tapping buttons. When a string of figures appeared on the television screen, he memorized them quickly. Then he punched more buttons.

Twice the Prince called his deputy to come and type special instructions for the machines.

An hour before the deadline, the Prince made his decision. He called his deputy one more time.

"Carizini," he said.

"Yes, sir."

"Now they'll be on our side for a change. But call Thesiger, too, and tell him his bid was too high. Promise him something else. The schools. Keep him happy."

The deputy smiled, showing his pleasure and relief. "I'm afraid there's nothing new about Mr. Walker, sir. The chief is still trying."

The Prince sighed. "You can tell him to quit now."

Thereafter, the Prince felt his city and knew it well.

One October evening, his deputy came to see him and stood stiffly in the center of the room. He asked, "Well, what can we do now, sir?" He spoke loudly in order to be heard over the clicking teletype.

The Prince knew his deputy was worried because a liar and fool had been chosen to head the Party's ticket in this election, and the deputy had long ago learned that such men do not invariably win.

"There," said the Prince, pointing a steel finger.

The deputy peered at the television screen. The figures appeared firm and immovable:

O'MARA	50.9%
KELLY	35.7%
BROWN	6.6%
UNDECIDED	6.8%

O'Mara was the liar and fool who headed the Prince's ticket.

"Are these the citywide figures, sir?"

"From this morning."

"Maybe I should run an update."

"Go ahead."

Moving to the appropriate machines, the deputy tapped keys, pushed buttons, pulled levers. The Prince touched a device in the left arm of his chair.

A new set of figures appeared on the screen:

O'MARA	46.3%
KELLY	42.9%
BROWN	4.3%
UNDECIDED	5.4%

The Prince frowned. "Get me a ward breakdown."

The deputy rushed to obey. Eventually, he brought a long string of figures.

The Prince glanced at the list. "Forty-two, thirty-eight, twelve, twenty-six. The forty-second is dreadful. We're bleeding."

"That's Mr. Karpinski, sir."

"Call him."

"He's done well in the past, sir."

"Do as I say." The Prince rested as his deputy used the phone.

A narrow, gnarled face broken by a huge nose appeared on the screen.

"Mr. Karpinski," the deputy said, "I'm afraid you're going to have to be temporarily relieved."

"Oh?" The face remained calm, but the effort showed.

"Your ward dropped twelve points in twelve hours."

"That wasn't me," Karpinski said. "Kelly came in here today and kissed every baby in sight. How can I stop that? You tell me."

"I'm sorry, sir."

The screen went blank.

The Prince, seldom at rest, tapped buttons, jerked levers, studied dials. A punched card lazily drifted from an opening in the side of one machine. The deputy scurried to retrieve the card. It contained data regarding the age, sex, race, ethnic designation, religious preference, income, voice tone, hair color, weight, intelligence quotient, level of schooling, public assistance status, and voting record of the new ward-leader in the forty-second.

"Find out the man's name," the Prince said, "and call him. I want him on the street tonight."

"Yes, sir." The deputy hurried to another machine. "But what about Mr. Karpinski?"

The Prince considered. "What's our Selective Service situation this month?"

"I know we're at least forty men short for the army."

"Good. Then Karpinski will make it thirty-nine."

The old woman burst into the room and stood glowering at the Prince. She wore a long, baggy, flower-spattered dress, and her eyes were highlighted with bright green

shadows. She shook a fist at the small, curled figure in the elevated chair.

"You did it!" she cried. "My son, my boy, not even forty years old, and you sent him to die. Who are you, Mr. Logan? What kind of man? Are you our new god up high in heaven? When my father first came to this city, he was told he must vote your way. He did that—always—and told his children to do the same. Then my son goes and walks the streets to find you more votes. He works hard—he cares. Now you say he must go to the army. Why? I ask him, and he says he messed up the election. How could he do that? God Himself couldn't do that. You always win. For as long as anyone remembers, you win and win and win. Yet you kill my son. He is dead, and you are the murderer."

"Go on," said the Prince.

The old woman said, "You have nothing to fight with yourself. No hands. No legs. My son must go and die because you cannot serve. I say that makes you nothing but half a man. And I say I will see you die. That day will come, and when it does, I will be there to see your grave."

"I have a project I want you to handle personally," the Prince told his deputy. "The subject is a delicate one and I don't want word to leak."

"Of course, sir."

"I want you to find a certain name."

"For an appointment?"

"No."

"Civil Service?"

"No."

"Selective Service?"

"No, I want a wife."

"What?" The deputy struggled to contain his surprise. "Whose, sir?"

"Mine."

"Oh, God." In spite of himself, the deputy laughed aloud. "But why, sir?"

"I understand there's been talk. Fifty years old and no wife. They want to know if I'm human. I intend to show them."

"I quite understand, sir."

"I doubt it. What I want is this." The Prince glanced at a crinkled sheet of paper. "Age, twenty-five to thirty, single, with no previous permanent relations, legal or otherwise. Handsome but not excessively beautiful. A respectable occupation. Good family, honest but not wealthy. Citizen of the core city. Catholic. French or Italian ancestry. The latter two requirements are not essential but should do us no harm at the polls."

The deputy nodded, studying the notes he had made. "Some of these qualities are rather abstract. It may take me some time, sir."

"The wedding will take place in two weeks. I'll give you half that."

"Yes, sir."

It took the deputy four days to

find the name of Esalee Vantego. The wedding took place in the Prince's private throne room. The priest shouted to be heard above the clattering machinery. The bride wore white and smiled constantly. The Prince leaned back in his chair and seemed to sleep.

When the ceremony was over, Mrs. John Logan moved to a twelve-room Victorian house overlooking the lake. Her family soon joined her in residence, and there were nine servants.

She never saw her husband again.

The Prince phoned his mayor and asked, "How quickly can you do this? I can let you have a week."

"That's impossible," said the mayor.

"I asked how long."

"But you must be reasonable, Mr. Logan. I can't force this through the city assembly. They'll want to know why. These people—how do they rate a swimming pool? You ought to come over here and see the letters stacked on my desk. It's the middle of summer and they all want something: parks, games, trips, swimming pools."

"My deputy will give you the exact location. One week—no more."

"Impossible."

The Prince studied the computer data in his lap. The figures seemed to speak aloud. "You'll have the assembly votes you'll need. Nor will the papers print a word before the second section. The same day, I want you to recommend a ten percent cut in police salaries."

"That would be suicide for me to do."

"Not when we vote it down."

"But how does that help me?"

"It doesn't."

When the conversation ended, the Prince's deputy, who had been asked to listen, said, "He's right, you know. Those people are going to vote for us no matter what. Why give them a pool?"

The Prince fiddled with his chair. Throughout the room, machines hummed, wires buzzed, lights flashed. "You wait," he told the deputy. "You'll see."

Two weeks later in Brooklyn, New York, a man named Manuel Mendoza spoke to a lustily cheering crowd of five thousand. Shortly before he finished his address, a bullet ripped through the top of Mendoza's skull and spattered various onlookers with bits of brain and bone.

Within an hour, a large portion of the city was ablaze. Within another five hours, similar portions of Boston, Los Angeles, Miami, and Newark also burned.

In the Prince's city, although grown men wept openly in the street, not a stick burned. Children splashed merrily in the newly opened community swimming pool.

Working late, the Prince raised a

fist to the television screen and smiled. He told his deputy, "I said you should wait."

He granted interviews only infrequently and then most often to experienced reporters who knew the rules and obeyed them, but occasionally a young reporter slipped inside the throne room and lectured the Prince fervently on the subject of democracy.

"And what is that?" said the Prince, his steel hands twitching. "If it's what you want, then go a hundred miles in any direction and stop at the first small town you reach. Or try Alaska. Or Oregon. Vermont, Cuba, even Washington, DC.

"But here? In this city? Does New York have democracy? Or Boston? What about San Francisco, Philadelphia, Chicago, any of the big cities? I say those that still play with democracy are dying a little bit quicker than the rest. It won't work anymore. A man must rule his city with only one thought on his mind: he must be smart enough to realize that all cities are anachronisms. The only people still living in them are those too damn desperate to get out or die. Diseased men live in a diseased place, and when it's your job to keep a terminal patient alive, you do not first conduct a vote before deciding what measures to take. Instead, you act. You do what you can. You give your patient what he needs, no more. It may not be aspirin. To save a dying man, sterner medicine may be necessary."

"But you don't have to cheat or rob him, either," the young reporter said.

"Nor do I. The others—my friends and associates—perhaps. I don't deny the scandals. But none have touched me. None ever will. I don't need money, and therefore never take it."

"Then why do it?"

"What?" The Prince frowned.

"Then why do it at all? If it isn't money or pleasure or fame, then what's left? Power? Only that? You tell me, Mr. Logan. Why?"

"Get out of my office," the

Prince said. "I've talked long enough."

"Ned Walker," whispered Johnny Logan, glancing up in obvious pain from where he lay curled in the reclining seat of his chair. A doctor and two nurses huddled in residence. They had brought some machines of their own to add to the general clutter in the dark tiny room.

"Hello, Johnny," Ned Walker said. He jerked a thumb at the medical team. "I'd like to say good-bye alone."

"Get out," Logan told the doctor. The severity of his illness showed only in the tightness of his lips and the softness of his voice. His pale, sallow flesh appeared no closer to death than ever.

"I'm not sure that would be wise," the doctor said.

"You think any of this is? Dying? Get out of here."

The doctor shrugged. "If that's your wish, sir."

When the airlock closed and they were alone, Johnny Logan forced a grin. "So tell me what brought you back, Ned. Money? A job? After all these years, have you finally swallowed your pride?"

"No, Johnny. I have plenty of money."

"Then you're here to gloat. To laugh at me for being so dumb as to die. I'm sorry as hell, Ned, but it really wasn't my idea."

"I don't want to laugh. I heard you were sick and wanted to say good-bye."

"Well, you've said it. So now what? If you don't mind, I'd be curious to know a couple things. Why did you leave me? Where did you go? Who paid you off?"

"You know why I left, Johnny." Ned Walker stared at the clicking, humming machines that filled the room. Strings of ambiguous figures danced upon the lighted screens.

"Because of those three bastards. Right?"

"No, not really."

"Then you tell me: why?"

"As to where I went"—Walker drifted along the edges of the room, inspecting the machines he had built, stroking their cool steel hides—"name a place and chances are you won't be far from wrong. I've used a hundred names in thirty years and if I told you ninety-five you'd shake your head and wonder why. The other five—well, I've always had my talents."

"And your plan. Don't think I ever forgot. I remember your pathway to success."

Walker moved away from the machines and approached the chair. "That's part of the reason why I came here. These machines—they're mine, right?—I designed and built them. I always wanted you to learn how to use them."

"I think I knew that better than you, Ned."

"No, Johnny."

"I kept this city alive. Doubt my

motives, curse my methods, but you can't take that away."

"And now?"

"What do you mean?"

"Now that you're dying, what happens next?"

Logan shook his head. "That's their worry, not mine."

"But wasn't it yours? Wasn't it ours once? Couldn't we have done something?"

"I did all I could."

"No, that's not true."

"I did what you said. You said give them what they need. If you don't like the results, blame yourself."

"Then you never understood." Ned Walker edged toward the door.

"I know what you said," Logan called after him.

"So?" Walker paused and looked at the machines. "You didn't do it." He shook his head. "These machines, the polls and computers and data. How could that help you?"

"By telling me what they needed."

Walker turned away. "No, Johnny," he said softly, "that won't tell you what they need. That just tells you what they want." He touched the lever that opened the iron door. "And that's all you ever gave them." ■

The Abbot leaves the room and I'm alone in Brother Peter's cell, on the cot staring at the ceiling. Then I feel my cortex slide, my vision doubles, there's the two-thoughts-overlaid sensation, and then the images fuse

Birth

Good thing it's

Youth

Not real-time

Adolescence, novitiate

Or I'd go crazy watching home movies

Monkhood

Ask somebody to tell you his life story

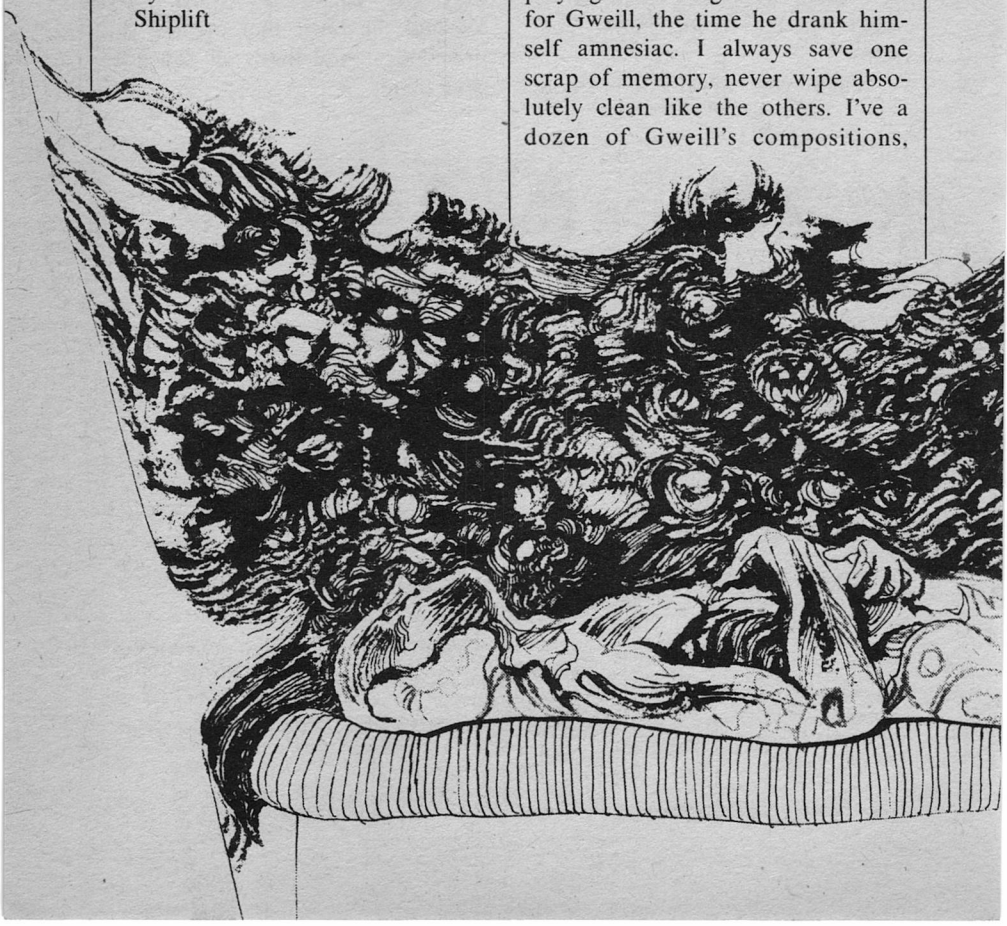
Shiplift

And see how the memories condense as you go back

Landing and the beginnings on Sebastian

Whew. I (I? He.) am fading. The early memories are as boring as always. But this is just the preliminary. The rest, the hard, important parts, must wait for a meal and some personal remembering. Peter was strong in his monk's simplicity; I'll reinforce my eigenpersona for its safety. And he died hard. My pain filters need to be checked closely.

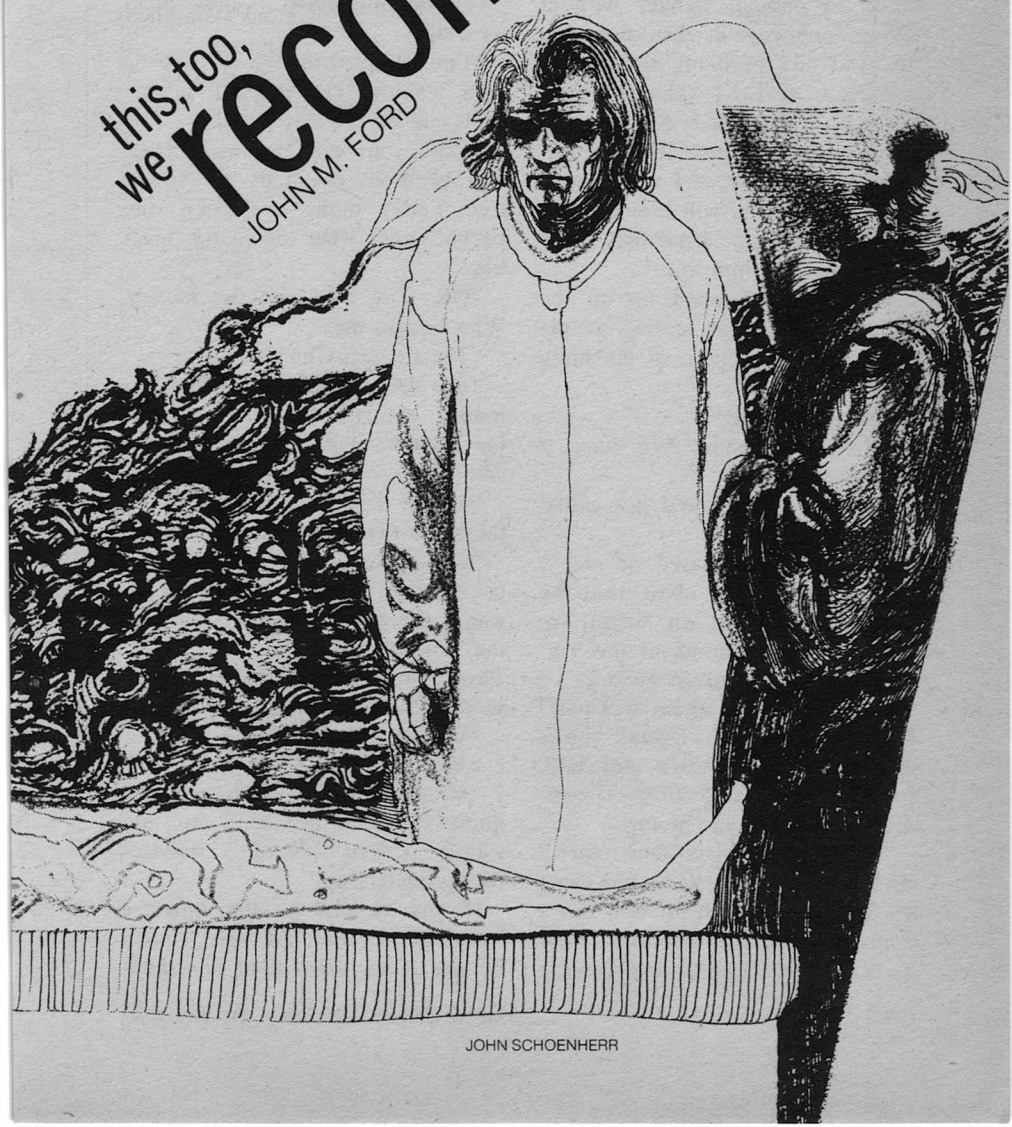
I had been at the soundboard, playing something I'd remembered for Gweill, the time he drank himself amnesiac. I always save one scrap of memory, never wipe absolutely clean like the others. I've a dozen of Gweill's compositions,



What happens
when, in the quest for truth,
you find it?

this, too, we reconcile

JOHN M. FORD



JOHN SCHOENHERR

along with a special knack for public speaking from Grove Wylde, pilot's training from Sam DeCoslo—a dozen pieces from a dozen others. My Agency psychist tells me it's unhealthy in the long run, that a Rememberer's eigenpersona is exposed to enough danger without letting fragments of distortion pile up. And he's probably right; once or twice in a year I wake up shouting the impassioned defense that saved Jacob Birney from atomization. Of course, if I wipe Judge Haver my sex life will lose its marvelous uniqueness. (And they wondered what did him in.)

Then Teller popped up on the tele, blank as ever, staring at me with all the animation of the filing cabinet he is.

"Morning, Teller."

"Morning, Easton. We have a case for you."

"Oh? I thought you'd just called to pass the time."

If Teller was amused or angry, he didn't show it. Not that he would have. "Out on Sebastian, Cygni system. A monk of the Vialandran Order, dead, in stasis."

"You called me about a Theist? A *monk,* yet? Teller, I think you're slipping. Look, Raschid and Falk are both screaming blue Theists, and they can use the money."

"We need a Class One, Alec." He was shaking his head and using my first name, which for him was a display of violent emotion. "And we need you quick. It's paying double-standard plus expenses."

That was—never mind how many creds; what it really added up to was pressure on the Agency, pressure with money. Well, very few of my principles are inviolate, given sufficient incentive to violate them. "It's sounding better, Teller. Shall we talk?"

"I'm calling from the car outside your window. Get down here and we'll talk on the way."

Damn your efficient soul, Teller. I grabbed my essentials kit—people like Teller make me keep one packed—and went down to meet him.

"OK. I've sold out for money. Who bought me?"

"The Central Church."

That was certainly pressure and money enough. "For one monk? He must have done something incredible."

"If he saw what the Church thinks he saw, he may be a saint."

"Oh, come on, now. The CC is paying *me* double Rememberer's wages for a secondhand Vision of the Cosmic All? Be real, Teller. The least you could have done is send Falk."

"We did. He died."

"*What*?"

"He ran forward to the point in question. Then he stood up and calmly walked out of a window twenty meters up."

If anyone else in the universe had told me that, I'd have known he was lying. What kind of a hell-

thought could make Falk jump? Theist or not, a Class One's eigen just doesn't accept that kind of thing.

Teller read my mind. Not literally—he had another talent.

"The subject was tortured, Alec. Extensively and by experts."

"You can do better than that, Teller. Have you forgotten Iolas?"

"It is not within my capacity to forget." True. That was his job, and his talent. "However, the wounds Iolas received eventually killed him."

"You said this subject was dead."

"Correct."

"You aren't making sense."

"Also correct."

Then he told me what he knew, and once again I was glad it was Teller speaking. Because it *didn't* make any sense.

"If Brother Peter's soul was truly translated to Heaven, he will qualify for sainthood. He would thus be not only the first Vialandran saint, but the first saint not on Earth."

The Vialandran Abbot was a small, thin man, but hardly the grim ascetic one expects a monk to be. He sparkled with life—in a properly sanctified way, of course. As we walked toward the cell I'd been assigned, he seemed to have no trouble pacing me, and I stood nearly half a meter above him. He was definitely excited at the prospect of canonizing one of his Brothers, and just as definitely determined not to speak about Falk.

"You have reason to believe that the Brother did not die naturally?"

"Mr. Easton, our belief is that he did not *die*. Please understand. Translation of the spirit is not death, but an ascension to the higher plane, called by God Himself."

"That's quite an assumption."

"If you had known the Brother, you would find it easier to accept."

"When this is over, I'll know him better than anyone . . . except Falk."

"Ah, but your knowledge is not in our context. Brother Peter seemed to many of us to be inspired not only of the Holy Spirit, but to have the very heart of Father Vialandro."

So he had a touch of the fanatic. I couldn't believe that any fanatic could make an expert Rememberer pull the plug, but it was a place to start. And I didn't want my plug pulled. "Was there any particular characteristic he had? His memories will be heavily filtered through my own mind, and any outside information will help me analyze what I receive."

"Yes, yes, there is one thing especially. Are you familiar with the story of St. Sebastian?"

"No, I wouldn't—wait, isn't there a painting? A man, shot with arrows?"

He nodded firmly. "Father Vialandro's patron. Sebastian was a soldier in ancient times. He was

converted to Christ, then condemned to death for his belief. He was transfixed by arrows, again and again; yet he did not die. His executioners were forced ultimately to behead him." The Abbot was staring ahead, with a strange expression.

"Pardon my saying it, sir, but it sounds like a ghastly kind of patron saint to give a child."

"Indeed," he replied, apparently without conscious thought. "Father Vialandro spent his life pursuing the question of St. Sebastian."

"How he survived the arrows?"

"*Why* he survived them. Why his agony was prolonged, not ended by death." He was very quiet then.

"And did he find an answer?"

"No, my son." From *Mr. Easton* to *my son* in five minutes. "He found only Brother Peter, to carry on the search."

"Until—"

"Are you ready to begin?" he asked suddenly. "This will be your cell."

"Oh. Yes, I'll change and we can impress right away." We went in and I realized why he called it a cell. It was barely three meters cubed, doorless, walls plain except for an unglazed window, draped to keep the draft down. The only furnishings were a stamped-metal cot and nightstand. Cell, indeed. In the Sector Penal Centers the toilet isn't down the hall. Oh, well, I'd be out of there soon enough . . . one way or another.

I undressed and put on a sanirobe. The Abbot was staring. I'd nearly forgotten the weird effect it has on Theists to see a tall blond man, barefoot, in a trailing white robe.

Not that I cultivate any Christ-resemblance; I don't even have a beard. But then Theists are an odd lot to begin with.

It was time to finish preparations. "Abbot?"

"Yes, my son?"

"I wonder if I might have a glass of your brandy. Such things always seem to ease the impression."

He smiled and went out, returning with two glasses and a full liter of Vialandrine. It was magnificent stuff, and far too expensive for even someone on my salary to drink regularly. But I am a Class One, and that means adaptability; on Earth I ask for bourbon, on Sredni Vashtar at least one huge-eyed houri. It's a splendid little dodge, one we all use. And am I so greedy? Lancaster insists on hundred-year bourbon and virginal Vashtari. (No accounting for taste.)

We finished the brandy and I said I was ready. The Abbot ushered me into a stone cubicle exactly like my own. This one, though, was completely bare except for a cot, two stasis cones, and the thing between them.

"Brother Peter."

Well, once, maybe. I've Remembered more dead men than anyone else with the talent; lased men,

burned men, crushed men. I've died with them in ways you never heard of. But I'd never been flayed alive. And it looked like whoever had worked on him had only started there.

I knelt next to the cot. The Abbot joined me.

"No, no, you'll have to switch off the stasis. Haven't you seen this done?"

"A moment." He ran his fingers over the beads on his belt, mumbling. Then he rose and went to the generator cone.

"The body has had time to corrupt."

"While I'm impressing his patterns, I won't see, hear, or smell anything." Or whose senses are you worried for?

"I understand. When you are ready, Mr. Easton."

Last names again. So be it. I slid into my impression position, kneeling, head back, arms straight with hands planted firmly on either side. I hummed the deeptrance mantra, not really caring what the Central Churchman might think. And then I drifted in, and whispered "Now," and the stasis-yellow vanished. In he came, smooth and warm and easy. Then rough and hot and hard, red wine changing to neat whiskey, and I snapped forward on my face and burned. Then there was the deep silence, like the empty tube after the train has gone, and I said "Enough" or something like it.

"Is it complete, my son?"

I just groaned. He helped me stand, and I took it all back about his delicate sensibilities. Because I was fouler than any corpse. Every pad in the sanirobe was soaked with sweat and urine, and the anal pouch was heavy. My sphincters hadn't blown like that since I got the evidence that atomized Darsa the Mutilator. For two years after that one, I fasted and gulped cleanout pills before every impression. But it had been a long time since then, and I was a Class One. Well, the hell with it. That's what the sanirobe was for, and nobody was keeping score.

I'd decided to do the run in three stages; first twenty years of preliminaries, last twenty of monkhood, then *the* day. Condensation factor was on my side; people in exciting places like monasteries run every day into every other day. The first run was the usual thing; youthful exuberance and all that. The only useful thing I learned was that Peter, though not all that deep a character, had the Courage Of Your Convictions No Matter How Crazy that makes firebrands and martyrs. It also makes an impressed memory hard to override with your eigen.

Loosen up . . . slide . . . double . . . meld . . .

It is an honor to be of the Vialandran Order

Was a good Space Scout too

Can capture within myself some of the spirit of the holy father

Get on with it. I can't stand hero worship

Religion of the natives, *Malak*, is founded upon the basest and most heathen of principles

They hadn't stumbled upon an identical mythology. But all the natives I've seen are happy Central Churchers; what happened to

Concept that God is glorified by the suffering of innocents. To this end they perform the most gruesome

Sounds like the Brotherhood of Pain on Kalliarchos

Using medicines to deny their victims the surcease of death

Know a hundred doctors who do the same thing for money. Hey, wait, St. Sebastian ties in

To cleanse this world

Native Religion Laws

Fire and the sword

Damn!

Shall alone seek out the very temples of the Malakki, that they might be

Seek them out *alone*? I think

Hand of the Lord is upon me in the dark places

I (I? Yes, I.) knew. What . . . and maybe why. The Abbot was sitting across from me. I looked up dizzily.

"The Malakki killed him, didn't they? He went after them, into the streets alone, and they finally killed him."

"No, my son. The Lord took him to His own."

"Come *on*! He must have been a brave man, but no one can keep going forever."

"My son." He looked at me, *into* me, and I started to understand all those stories about the radiant faces of saints. I mean, there are the girls on Fourilani, with their skin so clear it diffuses light, and I've seen a few Heswall Nightsiders, who have bioluminescent skin cells and really do glow a little. But the Abbot was something else entirely, the lines and veins in his face, his deepset brown eyes, all *shining* like living stained glass. That look said *I do believe* in a way that made me forget he was a superstitious Theist and trust him.

"Yes, Mr. Easton. The Malakki tortured Brother Peter most gravely. But they did not kill him. To have done so would have been, for them, the greatest possible insult to their god; depriving him of his victim. No, it was not their action, but our Lord's, who saw his servant in torment for his faith, and translated him even as the prophets of old."

"I saw the body, Abbot. It was terribly damaged."

"Do you not think the Church requires the most stringent proof of miracles? When a group of loyal Christian natives brought the Brother's body to us, and we ascertained what had occurred, our doctors at once examined his body for

any corporeal cause of death. They found none. Our doctors are skilled and thorough."

I knew they were. A peculiarity of Theists is their rationalization of death coupled with an iron grip on life. The combination makes good doctors. "Then I am the final piece of proof, only?"

"The only witnesses to the Brother's translation are a few Malakki, and these of course are flown. Central Church asked that we call in one with your gift, to see the truth."

What truth did Falk see? "You are aware that many men don't carry any memory of their deaths? Under stress or trauma the mind may make no impressions, or erase those already made."

The Abbot smiled, and once again suspended my disbelief. "And if there is nothing recorded, then our Brother died and your task is done. But if his soul lived on through those moments . . ." He turned to stare out a window, apparently awed by the concept. After a moment, he turned to me and spoke softly. "Mr. Easton?"

"Yes?"

"It is in the Scriptures . . . 'None may see my face and live.' Should the Lord appear unto you . . . if your soul is in doubt, my son, perhaps it should be settled now."

He did care about Falk, though not in a way he could talk about to an atheist. It's too common a failing, among our kind as well, to censure. I assured him that I could break off the remembrance flow at any time. From a certain perspective, it was the worst thing I could have done; lie to a priest before God came for me.

Slippage: Diplopia: Twoness.

I am lying on my cot

Walking toward the infirmary. May God who understands and forgives all forgive my weakness. All flesh is grass, and in my corruptible

GAP.

One of me again, the one still in the cell, lying quiet. I'm beginning to sweat a bit. This is a startlingly perfect dropout! Brother Peter is doing a Big Bad Thing in the infirmary, something his cortex absolutely denies. What? I tick off the list:

Sex, several variations

Worship, something pagan

Drugs

Alcohol

What else could

City is gray today, and dark clouds gather. It is a day even as that which surrounded fated Golgotha. Lord, stay my thoughts before I am prideful, elevating myself

(I? Not-I) feel some kind of ulterior motive here. There's something on my mind besides saving the heathen. Something like

This is the place. Young Kwiak'lotl was very definite that it lies beneath the shop of Warv'iagl the tailor. I enter. Warv'iagl is not

here. At this time of the day? It does not speak well for him. There is a curtain here, covering—a wall? These are frugal people. They do not curtain off mere walls. There—as I

Not actually going to

Rent from top to bottom. My shaking causes the panel behind to roll aside

Megalomaniac with psychotic delusions of

Down, down into the blackness of the pit. I must take care not to excite myself, not yet; the Lord moves in his own

Preconceived ideas, where's my Class One adaptability? I am a Theist. Metaphor is substance, all is parable, the Word

The Word and not hearers only. They are fearful, these lions in their den; have their mouths been shut? No, they fear only the sword of the Lord. Poor heathen, they too have suffered for their faith

Am either more compassionate than I had believed or I am totally crazy. Perhaps I—what's that twinge, that ache? I shouldn't

Realize that I am alone, and grasp at once the choiceness of the offering. They

Am at conflict, then I understand. I *know*. Greater love

Hath no man than this

That he lay down his life

For not his friends alone, but all his brethren. I am held, though I do not struggle. I see the implements, catching the harsh light

Pain filters *up*! Ready to

Something on the skin, not damaging the tissues, touching the nerves like flame

Calm! The ultimate promise of Theism: sin—cancelation—a better

Knife descends, planing. A spray follows, sealing in the fluids, preventing shock, miracles of medicine perverted to

Tingles, needles, millions of them, hold it back, filter, keep my eigen out of

I did not know, I did not know it would be thus. But I must not, dare not allow so soon an

End? Allow? I? (I? I? Unclear—)

My corporeal self cannot bear it. Lord, make an end of

Confusing, disordered, is death in my hands or in God's, is there a, *am I*, aaaah, filter, filter

Where is the rest for the just? Whence cometh mercy

Eroticism to pain but only when linked with sexual pleasure (Abnormal Psychology, Gessner) and where is

Thy peace, O grave, where is thy quietude? Deliver thy servant

I'll black out soon if they let

Stimulant injection, that I may not faint but only

Emotion surge with the stimshot

Am I the Son of God, that I must bear this? Holy Father must it always be so, must the blood always be required

Delirium: I am bleeding no I'm not *I* am, I will raise my arms see the unharmed skin but the Malakki

pin me tightly though they are not here and I we no I two of us oneness of all as my adrenaline flows pure and clear dissolving the coating, releasing

Giant molecules of encapsulated neuroproteinase. Injected in the infirmary while I refused to remember

I am dying

By my own hand and no god's

The heavens open and I realize the heavenly vision

Of a being I cannot look upon

For his wrath is kindled

Against me

And I/I/we know that the high judge sitteth upon the Mercy Seat and is cheated of his due

And I (I? I.) am stretched upon cold stone, and I scream. But it is only my monk's cell, and the Abbot is hovering above me, calling for cold water and warm brandy.

Two hours later, bathed, nursed with Vialandrine, I was capable of communicating again. The Abbot took me into his office, alone, and asked if Brother Peter had been received unto God. And I said yes, which was the truth. Then he asked for details, and I began to lie.

I described a magnificent holoshow production, starring the archangel Michael, with a heavenly host of thousands and a guest appearance by the Christus himself (whose mighty visage was suffused with pure light and therefore invisible). It was the most outrageous fabrication of my life, and it is going to make Brother Peter the first off-Earth saint.

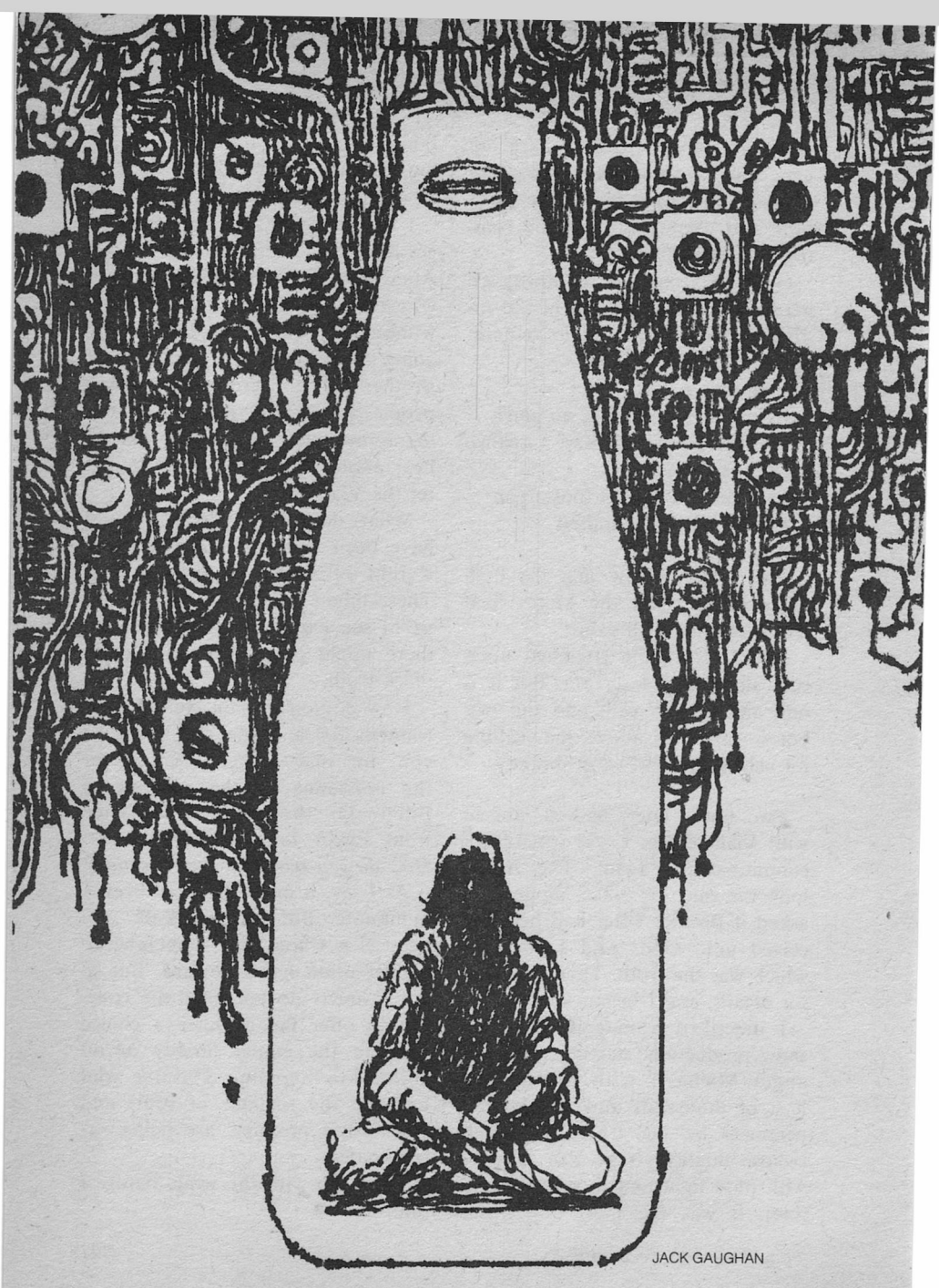
I called Teller and told him to get me out of there. He got. I'm on Alteschloss now, an Agency world where I can have a wipe done without any questions. This one is going to be total—no souvenirs of Brother Peter. There are too many people who know memory is holographic, too many who'd like to hear about the ascension of St. Peter the Vialandran.

What do I say? Peter/I could have been hallucinating, under the weight of pain and poison . . . There might have been nothing for us to see except black infinity. Or there might have been an equally black truth.

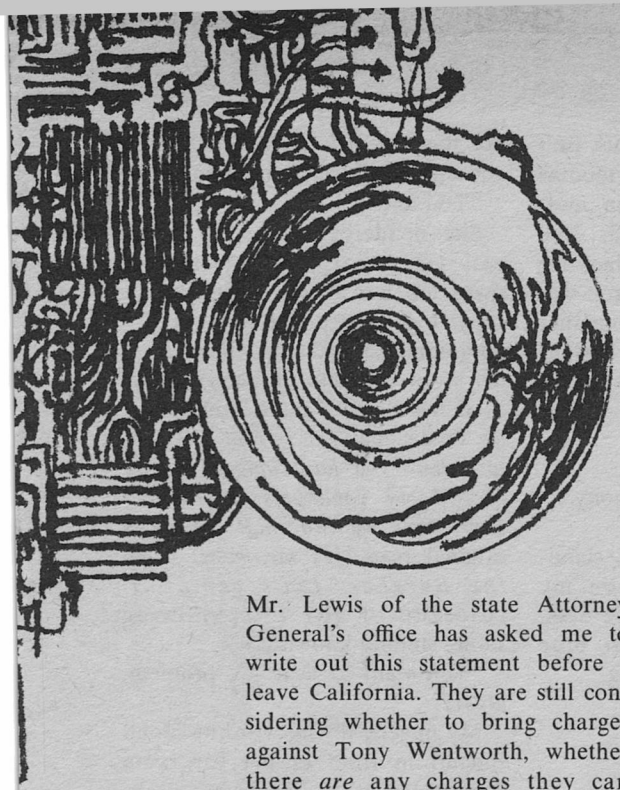
How do you explain eternal punishment for a single sin? How do you, for that matter, account for the existence of the serpent in Eden? Or the great deliverance from Egypt—to seven Israb wars? *How do you reconcile St. Sebastian?*

As I say, it might have all been a nightmare. But there is Falk . . . he was a Class One Rememberer, by definition not a coward. But so am I, and I do not have the courage to offer the universe a choice between the empty finality of no God—or a Supreme Torturer who lives on the screams of souls and whose true prophets are being exterminated.

Hurry up with the wipe, before I jump too. ■



JACK GAUGHAN



projections

The price of freedom is eternal vigilance—and then some.

STEPHEN ROBINETT

Mr. Lewis of the state Attorney General's office has asked me to write out this statement before I leave California. They are still considering whether to bring charges against Tony Wentworth, whether there *are* any charges they can bring against him. The state's Fair Campaign Practices Act evidently fails to cover telethesia projectors.

OK, Mr. Lewis, you said tell my story in as much detail as possible but "stick to the facts." I know you only want me to talk about Tony's role in it. You want "the big fish." (You used that phrase at least four times during our interview, "the big fish.") Us minnows have to tell the story the way it happened to us.

First, there was Mr. Winthrop, my former employer (perhaps still my employer; I have never, officially, quit). The Winthrop. What shall I tell you first about the Winthrop? That he may or may not be

crazy? That's true of all of us, isn't it, Mr. Lewis. About eight months before the June primary, in mid-October (October 14, 1993. 2:00 PM—is that enough of a fact for you?) I did think the Winthrop was nuts, though not crazy. I remember discussing this profound insight with Opal, the Winthrop's secretary. I remember saying, "He's nuts, Opal."

"Shh, Roger, please."

"Flipped, off his rocker, loony."

"Roger, he'll hear you."

I leaned across her desk, standing but resting my chin on my palms and my elbows on the desk, gazing into her opalescent blue eyes. Odd effect. Bad lighting.

"Opal."

"What?"

"Is he still meditating?"

"That's what he told me."

"Was he serious?"

"He sounded serious."

"Opal."

"What?"

"Let's go out tonight and eat dinner and have a few drinks and go back to my place and hit the sack."

She glanced around, furtive, embarrassed. "Roger, you're just *horrible*."

"I know."

"Besides," said Opal, the ever unattainable, "I'm busy."

"With who?"

"Whom," she corrected.

"Opal," I said, leaning closer, my heels lifting off the carpet, "this is not the time for grammar. This is you and me I'm talking about."

"You and I?"

She pondered, looking past my ear. Grammar ploy again. She spent too much time reviewing ad copy. I got my perfectly idiomatic, ungrammatical ad copy back from her so twisted into proper grammar it sounded like a poor imitation of an Englishman. *It is I at the door for whom you have longed. I have fetched six containers of Burgher Beer. Now we two shall love.* The original read, *It's me, baby. I got the Burgher. Let's get at it.* (Closeup of girl with knowing smile, smiling knowingly.)

"You want to hear my problem, Opal?"

My fingers, toying with the blond spitcurl in front of her ear, were brushed away. "I know your problem."

"I'll tell you anyway."

"Not that beer thing. He doesn't want to see you again about that beer thing."

"But I want to see him again about that beer thing. Let me tell you about it."

She let me. One of our clients, Burgher Beer, submitted an ad campaign thinking their influence with us and our connections with the media would get it spread across billboards and smiling out of the cube. The beer magnate himself thought up both the innovation and the ad, casting himself and his wife in the lead roles.

Burgher Beer's Revolutionary
Ever-Upright Bottle
IT FLOATS!

Wonderful, I thought when I saw it, but who cares? The bottle had a valve in the neck. It let out beer without letting in water. Mr. Berger, president, owner, founder and principal consumer of Burgher Beer, spent a lot of time in his pool. He hated bottles sinking. When he reached out from his rubber raft, pudgy hand searching for the bottle, he wanted it there, bobbing. He assumed everyone did. He invented the valve. He invented the ad. He wanted himself and his wife in the ad, floating on their rafts amid a pool full of bottles.

"Wonderful," I said, explaining it to Opal, "but who cares?"

"You, for one."

"Only because the Winthrop pays me to care. And speaking of Mr. W, who's he with?"

"I told you, he's not with anyone. He's meditating. When he's finished, he wants to see you."

At that precise moment, Mr. Lewis, I believed her. Watching the overhead lights twinkle in Opal's eyes, thinking about the Winthrop in his office—meditating—I knew something was wrong, seriously wrong. Meditating, plunging into his inner being, peeling back the onion layers of his personality, perhaps even examining his soul—an object he could only possess if it were mandatory for everyone like a liver—at that moment, I knew.

"He's dinghy."

"No, he's meditating."

"On what?"

"I haven't the slightest idea."

"An ad campaign?"

"I don't *know*, I told you."

"Burgher Beer, is he thinking—I mean, meditating on Burgher Beer?"

"*That* I do know. He is definitely not meditating on Burgher Beer."

"But he still wants to see me?"

She nodded.

"Opal, let's change tacks. You say you don't know what he's doing in there, right?"

"Wrong. I said he was meditating."

"Don't get petulant, Opal. Is there anything else peculiar going on around here?"

She thought a moment, puckering, frowning, then looked at me. "No."

"You're sure."

"Positive." She started to return to the work on her desk, then looked up. "Except the crates, of course."

"What crates?"

She held her hands wide apart. "Big crates. Two men moved them into his office this morning."

I waited, expecting her to tell me more about the crates.

"And then?"

"And then nothing. The two men left. He closed the door. I heard some banging and he told me not

to disturb him. He was meditating."

"Then he asked for me. Opal, this is driving me nuts. What's he *do*ing?"

"There's one other thing." She looked at me, toying with me, making me ask the question.

I asked it. "What's that?"

"He asked if anyone in the office knew anything about yoga. I told him you did. You do, don't you?"

Yoga?

I stood up. I tried to remember everything I knew about yoga. A former girlfriend, a girl with a contortionist bent, had shown me several *asanas*, the postures yogis inflict on themselves. I remembered spending an evening with her, both of us playing with our own bodies when what I wanted to do was play with hers. I remembered her as a sort of sinewy, far-eastern drill sergeant, trying to teach me to breathe. "Roger, sit up straight. Remember, breathe from the bottom up. Breathing is very important."

Who could deny it?

The relationship with the yogi lasted only a few, twisted weeks. She did everything in one or the other of the yogic postures, a disconcerting, occasionally disabling—once or twice almost crippling—hindrance to the development of good karma between us. Still, my brief excursion into the exotic had left me with a residue of information about yoga. I had gotten over the sore muscles.

"Osborne?" called the Winthrop, his office door open.

"Yes, sir."

"You may come in now."

I went in.

I expected to find the Winthrop in a full Lotus, or at least half a Lotus. (I will refrain, Mr. Lewis, from saying half a Lotus is better than none.) Instead, I found him at a table next to the wall, a pair of needle-nosed pliers in one hand and an impassive expression on his face. Only the pliers were unusual.

In front of him on the table stood some kind of electronics gear. I know less about electronics than I do about yoga. I recognized a hologram recorder, an oscilloscope, a soldering gun. The centerpiece, a heavily instrumented box about a meter high and half a meter wide, looked like a cross between a computer—its lower half flickered with readouts—and a microwave transmitter. The transmitter impression came from a ten-centimeter parabolic reflector on top, aimed in my general direction.

"Like it?" asked Mr. W.

"Hmm," I answered, noncommittal.

"Know what it is?"

I guessed. "A death ray."

"No. A telethesia projector."

I tried to look intelligent. "I see."

"Do you?"

"I think I do. The bottom is the telethesia part and the parabolic reflector is the projector part."

"Good guess, Osborne. Wrong, but good. What's the first law of advertising?"

Quiz time. "Get their attention."

"And the second?"

The Winthrop had thought up the Ten Commandments of Advertising to harass his employees. We were quizzed frequently. "Show, don't tell."

"Have I got your attention?"

He had my attention but the quiz, delivered as if addressing a retarded talking dog, annoyed me. Too soon after lunch.

"You've got it," I snapped, regretting the words as much as my tone of voice. "Let's cut the quiz and get on with the Show and Tell."

He looked at me. Smiling? Hard to tell with the Winthrop.

"Sarcastic young man, aren't you, Osborne?"

Once committed, go all out. To retreat would have left me in an even weaker position, probably one several stories down and out on the street. "Not particularly. I just can't stand that damn quiz business. You do it about twice a week. If you want an answer, ask a question. If you know the answer, don't ask the question. I didn't come in here to play multiple choice or true-false. If you want to show me that thing, show me. Otherwise, I've got Burgher Beer to worry about in my office."

A shocked corner of my brain kept calling me a fool and trembling. *Remember,* it groused, *the bills will be there even if you don't have a job.*

Throughout this speech, the Winthrop watched me, progressively more astonished. When I finished, he grinned, a grin whose arc complemented the bulbous curves of his nose. He walked over to me, beaming with pleasure, and rebounded his fist off my shoulder, a comradely gesture I had never seen him use.

"God *damn*, boy. I was right about you. Character. I like it. I knew I saw that spark in you. The world is a *better* place, a *better* place." The grin faded, disappearing as quickly as it surfaced. His normal expression, sober impassivity, returned. "To business."

He stripped off his coat and unbuttoned his vest, simultaneously slipping out of his shoes. I wondered, momentarily, how far it would go. He stopped short of his trousers, leaving his vest loose around his torso. He began working through various yoga exercises, bending, twisting, turning, contorting. He paused, standing up but bent at the waist, hugging his knees and staring up at me from his kneecaps, his face red.

"You mentioned Burgher Beer."

"Yes, I wanted to talk to you about—"

"Not now. Ever drink any?"

"Once."

"Did you like it?"

My outburst to Mr. W had started the afternoon right, Honesty seemed to be the theme. Normally, I hate bad-mouthing clients. Momentum kept me at it. "Not much."

"Ever buy any?"

"No. Berger sent over a free case."

Inverted, he nodded, thoughtful. "It'll do."

"For what?"

He ignored me, continuing his *asanas.* I recognized some of them from my yogi girlfriend: Cobra, Locust and a sort of Flamingo on one leg, holding his other foot—extended behind him—and trying to touch the carpet with his free hand.

"Mr. W."

"Hmm?"

"You're going to slip a disc."

"Quiet, Osborne."

He finished on the floor in a full Lotus, feet in his lap, staring at his telethesia projector. His expression, though previously impassive, had deepened to profound impassivity.

"Pass me those electrodes," he said.

I found them, each with a different color wire running back to the projector. "The whole batch?"

"The whole batch."

I passed them to him. He worked each one under his gray hair, his fingers practiced and expert.

"Now the remote control."

I found it, a hand-held box with four touchplates, and handed it to him. He began alternate nostril breathing, pressing closed one side of his nose while he breathed through the other. I looked at the electrodes. I looked at the switch in his hand. Momentarily, I had an uncomfortable premonition.

"Mr. W, you're not going to commit suicide or anything, are you?"

"Don't be silly. Quiet now."

He tapped a touchplate with his thumb. The hologram recorder started, thick tape moving past the laser head. Several readouts changed, meaningless numbers to me. I felt like a nonbeliever at some exotic religious ritual. Something important was happening. Without the proper background, the ceremony was incomprehensible.

Watching the Winthrop—legs crossed, wires sprouting from his gray hair—made me uneasy. I knew his background as well as anyone, two PhD's from UCLA—psychology and electronics—years of unswerving ambition to reach the top of the ad game (said by some to be the best ad man who ever lived), his peculiar blend of vivid imagination and cutthroat business practices. Everything—the yoga, the projector, the Winthrop—fit with what I knew, yet remained incomprehensible. I felt like a man seeing a familiar object whose name he had forgotten, *Oh, yes, one of those . . . those . . . whatdoyoucallits.*

The Winthrop's thumb moved.

The tape stopped, rewound, started over. His look of impassivity vanished. A smile appeared on his face, grew broader, culminated in an expression of utter delight, wide-eyed and childish.

"Mr. Winthrop?"

The tape stopped. The delight vanished. Mr. W plucked the electrodes from his hair, took his feet out of his lap and stood up.

"That," he said, evidently satisfied, "is that."

"What—if I can ask—is that?"

"First things first, Osborne." He put on his shoes and coat, then buttoned his vest. "Coffee?"

2

I'm coming to the part about Tony, Mr. Lewis. If you keep coming in here every two minutes and reading over my shoulder and asking how it's going, it won't go at all.

In the ground-floor coffee shop of the Winthrop Building, the Winthrop asked me what I knew about California politics.

"You mean, all Sacramento is divided into three parts, legislative, executive, judicial—that sort of thing?"

He nodded. "More or less. We have a new client."

"Who?"

"Tony Wentworth." (Satisfied, Mr. Lewis? "The big fish" mentioned at last.)

He studied my face for a reaction. I drank my coffee, hoping the cup would conceal it. At the time, nothing I knew about Tony—and I knew very little—impressed me. Other than party affiliation, I have few prejudices against Republicans. Even so, Tony left me cold. I remembered seeing him during his previous campaign. I tried and failed to remember his position on any of the issues. I attributed my memory lapse to Tony's location, Northern California. The issues he raised, regional and complicated, had little impact in Southern California.

The Winthrop, dissatisfied at my lack of reaction, added, "He wants to be governor."

He got a reaction. I snorted into my coffee, sloshing it over the edge of the cup.

"You don't like the idea, Osborne?"

"He's not exactly Mr. Charisma."

"He's a challenge."

"So's swimming to Catalina with an apple in your mouth, but who cares?"

"You do. Starting tomorrow."

"Me? But—"

"No buts. I'm sending you up to San Francisco as our liaison man."

"But Mr. W, *I'm* a Democrat."

"Good. It will give you objectivity. You'll need objectivity."

I thought about it. What could I lose? Working on the Wentworth campaign had to be more interesting than working on the floating bottle campaign. Plus, I had always wanted to drive my motorcade

through the corridors of power, especially with someone else paying for gas.

"Expense account?"

He nodded.

"OK, I'll do it."

"Opal has your plane tickets in the office."

"With my name already on them?"

"Of course." He grinned. "I sell things for a living, Osborne." The grin faded. "Let's get back upstairs. It's your turn."

My turn? Yoga and wired for sound?

Feeling I had somehow, subtly, been sold, I followed Mr. W back to his office. Was he planning to plug me into his machine? Remembering the infantile expression on his face, I decided to decline the honor. I had heard about the rats who preferred stimulating their brains to eating.

In his office, he pointed at a spot on the floor. "Stand there."

I inspected the carpet. It seemed safe enough. I stood on the spot. When I looked up, Mr. W was adjusting the parabolic reflector on top of his machine, sighting over it and aiming—at me.

"Wait a minute, Mr. Win—"

Too late. The hologram recorder started. I waited, expecting anything from my hair standing on end to a lightning bolt, jumping from the reflector to my forehead. Nothing happened. The tape rolled. The readouts read out. I stood, slightly bored—even sluggish—watching the tapes and readouts.

"Feel anything?" asked Mr. W, checking his readouts.

"No."

I kept thinking my time could be better spent. Even drinking Burgher Beer would have been more useful. I visualized the bottle, then close-ups of the valve in the neck. I remembered the pool in my apartment building. I would spend enough time in the pool when summer arrived and enough time drinking beer. A floating bottle might have advantages. Perhaps I would call Berger during the day and have him send over a case or two.

"Feel anything yet?"

"Not a thing."

Better yet, why impose on Berger's generosity? I could buy a few cases on my way home. I liked that idea best. I smiled. I grinned, happy with my solution. A genuinely delightful prospect, even rewarding, to spend a few hours in the pool with a Burgher, The People's Beer.

The tape ended. Mr. W looked at me. He seemed to want some kind of response. I shook off my lethargy.

"Well?" asked Mr. W.

"Well what?"

"What do you think?"

"About what?"

"For starters, what do you think about Burgher Beer?"

"Oh, I'll probably pick up a couple of cases on the way home. I—" *Pick up a couple of cases! I hated Burgher Beer!* "Wait a minute, Mr. W." I shook my head. "I'm confused."

"First," said Mr. W, watching my face carefully, "you felt sleepy, sluggish. Right?"

"Yes."

"Then you thought about Burgher Beer, the bottle, then the valve."

I nodded.

"Then you evaluated it and decided to buy some. Your decision delighted you."

"I walked over to the table and inspected Mr. W's machine. "What *is* this thing?"

"A telethesia projector. I told you."

"How does it work?"

Fatal question. The Winthrop launched into a discussion so detailed, complicated and technical I could only get the highlights. The telethesia projector, a device developed by Mr. W in his spare time, would be his ultimate contribution to advertising. The idea had lurked in his mind since graduate school. With his PhD in psychology finished and his career direction—advertising—chosen, he decided to master the fundamentals of the most potent advertising medium of the Sixties, television. By fundamentals, he meant electronics with a smattering of communication and information theory. Deeply impressed by McLuhan, his PhD in electronics would help him master the medium while his PhD in psychology would help him master the message.

"It doesn't matter where you start eating the apple," aphorized Mr. W in the midst of his explanation. "Eventually you eat it all."

I took that to mean psychology and electronics were only his first bites into the apple of advertising, a big apple if you judged success with Mr. W's money.

In the mid-Eighties, he read a paper on generating Alpha and Theta rhythms in the brain through inductive fields, a technique used for sedation in hospitals. Technology had caught up with his vision. If you could put people to sleep electronically, he reasoned, without attaching electrodes and without the subject being aware of the process, you could do other things. You could advertise Burgher Beer inside his cranium, an ideal method of getting across a client's message.

He spent the next seven years solving the technical problems. Electronically reproduced and induced Alpha and Theta rhythms were one thing. Modulating the signal with an intelligible comment about a product was something else. The modulation effect was Mr. Winthrop's contribution.

I stared at the parabolic reflector. It eyed me. I still had difficulty

believing it. I had experienced it. *I* had been sold Burgher Beer, a feat akin to the proverbial Eskimo-ice-box sale. Yet, intellectually, the idea of cutting out the middle-man—the media networks, magazine tapes, billboards and matchbooks—cutting them out and advertising directly in the consumer's brain, devastated me. I pointed at the projector.

"This . . . this . . . *thing*—"

"Telethesia projector."

"—is utterly dia*bol*ical!"

He grinned. "Good, isn't it?"

"Good? It's *great.* I could sell Burgher Beer to the president of Schlitz with it. But Mr. W, it is the most complete and thorough invention for invading privacy since the lockpick."

"You're waxing poetic."

"It *scares* me."

"Don't be silly. It's just a machine."

"So's an H-bomb."

"I assure you, Osborne, it will not explode."

The conversation continued in this vein, slightly hysterical on my side. I pointed out how the projector could destroy every guarantee of freedom since the Magna Charta. The Winthrop, calm, batted aside my protestations like flies, annoying but harmless. His technique—the studied, ad man's technique—combined every known ruse; begging the question, argument from authority, *ad hominem, ad nauseam.*

At first, I thought he was consciously using the techniques, demonstrating his expertise. Eventually, I realized the evasions were habit, long engrained and automatic. He had been working on his projector for seven years, seeing it as the culmination of his career and a lasting contribution to the world. He was literally unable to see any objection to it.

Still, something more was involved in his blindness, something deeper within him, something on the bedrock level of his personal philosophy.

"Look," I said, mustering my last negative argument, "if I told you I had developed a device that could vaporize the cortex of every brain in America—the world even—what would you say?"

He thought a moment. "I'd ask what you planned to do with it."

"What does it matter? A device like that couldn't possibly have any legitimate use."

"Medically, it might be used to replace lobotomies, to vaporize the frontal lobes."

"OK," I said, exasperated at the irrelevant example, "medically, it might have some legitimate use, but generally—"

"Things aren't used generally, Osborne. They are used specifically. The type of judgments you're talking about only apply to people. If the person operating your vaporizer vaporized *every*one, I would call it bad."

At last, common ground. "Why?"

"It would ruin my ad business. If he only vaporized mongoloid idiots, I wouldn't care."

I felt a tremor in the common ground. "Why?"

"Mongoloid idiots aren't particularly susceptible to advertising and usually don't have much money to spend on products."

"Mr. W, you're judging *everything* subjectively."

"So are you. So does everyone."

"But you can't judge the whole world by the impact it has on your ad agency."

"Why not?"

"You just can't."

"Why?"

"Because." I had run out of arguments.

"Because," he said, walking around his desk and sitting down, "is hardly sufficient." He leaned back, cradling his head in his hands and gazing up at me. "You've got the makings of a good ad man, Osborne."

Here it came. He was going to fire me. Silently, I cursed my big mouth. Aloud, I said, "Thank you."

"Let me tell you something, something I believe but have never actually verbalized to anyone."

I waited, wondering how long he would give me to clean out my desk.

"I consider the world a better place when everyone is better. A qualitative standard, Osborne, and an old one. I like to think it reflects the Greek ideal of excellence, better ad men, better producers, better consumers. Better cops, better robbers. For the world to get better, we must all get better. I have devoted my life to being the best ad man I could be, the best Woodrow Wilson Winthrop. An ad man gets across his client's message. Once delivered, the message stands or falls on its own merits."

"But this message was inside my *head*."

"That's where all advertising ends up, isn't it?"

"True, but"—I pointed at his telethesia projector—"*that* thing takes the shortest route between two points. I could not *not* think about Burgher Beer, if you follow me."

He nodded, following me, probably ahead of me. "It got the message across."

"Not only that, it *motivated* me to *buy* that carbonated furniture polish." I held up two fingers, forked, eyeing him between them. "Two cases!"

"All advertising motivates, if it's any good."

He was confusing me. In seven years, he had thought through most of the objections. I needed more time to adjust. I poked at my temple with my index finger.

"But in my *head*, Mr. W! In my *head*!"

"Don't get hysterical, Osborne."

"It's *unavoidable* advertising."

"The best kind."

"It got across your message, but I had no free choice. I *had* to buy that beer. If you'd come up with two cases on the spot, I would have ripped my coat pocket to get out the cash."

"And now you're going to rush out and buy two cases?"

"Of course not."

"Why not?"

"I hate the stuff."

"And if you didn't know what it was like, would you buy some?"

"Probably, until I discovered I hated it."

During this exchange, Mr. W's hands had come down from behind his head. He had leaned progressively forward, hanging on my answers. He sat back, relaxed, smiling.

"That's advertising, Osborne."

"Are you going to use that thing in Wentworth's campaign?"

"We'll talk about that later. You've got enough to chew on for now. Opal will give you your tickets."

"Do you have any idea," I said to Opal when Mr. W's door slid closed behind me, "what he's got in there?"

She jotted the flight number and departure time on the outside of my ticket folder, answering without looking up. "No."

"A mind thing."

She handed the ticket folder across the desk. "That's very interesting, Roger. Here's your tickets."

"Opal, it *advertises* inside your head. It's a *mind* thing, a *mind* thing."

"I think you've got a mind thing, Roger." She shook the ticket folder. "Take these before my arm drops off."

I looked at the folder, started to reach for it, then pulled back my hand. "No."

She shrugged and dropped the tickets on the desk. "OK, so don't take them. I don't care. But they won't let you on the plane without them."

"I'm not getting on the plane."

"Mr. Winthrop said you were leaving tomor—"

"I'm not."

I began pacing Opal's office, alternately approaching and retreating from Mr. W's door. Opal, an annoyed expression on her face, watched me, her head slowly moving from side to side.

"Do you mind," asked Opal, asking whether I minded or not, "if I ask why you're not going?"

"Because. That's why."

"That's hardly a reason."

"You sound just like"—I glared at Mr. W's door—"him."

I paced, thinking. The more I paced, the more I frowned. No doubt about it. The Winthrop planned to use his projector in the June '94 primary, then the November election, motivating—no, coercing—people to vote for Tony Wentworth.

"Who is this guy, anyway?" I asked.

"What guy?"

"Wentworth."

Opal inserted a file card in the viewer on her desk. "Anthony Edward 'Tony' Wentworth," she read. "Born, September 12, 1952, Mill Valley, California. BA, UC Davis. JD—What's a JD?"

"I think it's a law degree. All those politicians are lawyers. Just read it, please."

She read. I paced. Tony Wentworth, married, no living children (daughter stillborn), wife's name Carol, nee Kraftkind—

"Opal, I don't care what his wife's maiden name was, *or* what his maternal aunt's maiden name was. Would you get on to the important stuff."

"You're very irritable today, Roger."

"I've got a lot to chew on."

—entered politics in San Francisco, winning a spot on the San Francisco Board of Supervisors. Two years later, he was elected Mayor, then State Senator, then a re-election as State Senator.

"Now he wants to be Governor," I interrupted.

"He does?"

"Just read, Opal."

She waded through election return statistics, campaign expenditures, everything but his maternal aunt's maiden name. Only two things caught my attention. San Francisco, a Democratic city since Gold Rush days, had elected Wentworth to every office he sought. That—considering the usual shouting-into-the-wind posture of Republican politicians in San Francisco—seemed significant.

My second observation seemed more a curiosity than significant. In each election, except the re-election, his percentage of the vote declined.

"OK, that's enough. It doesn't change anything."

Opal stopped reading. I kept pacing. Pacing, my resolve crystalized. I stopped, squarely facing Mr. W's door.

"I won't do it, Opal," I said to the door.

"What? Go to San Francisco?"

"Any of it. I won't do any of it."

"He'll fire you."

"I'll quit."

I took a step forward. The proximity detector picked me up. The door opened. Mr. W, an inquiring expression on his face, looked up. I stepped inside, the door closing behind me.

"Osborne, what—"

"I quit."

He pondered the words, frowning. "May I ask why?"

I pointed at the projector, its parabolic eye aimed uncomfortably in my direction. "That."

"Osborne," said the Winthrop, exasperated, "we've been all through this. At coffee, you agreed—"

"At coffee, I didn't know

about"—I jabbed my index finger at it, poking the air—"the Thing."

"Very good, Osborne. By changing the word 'that' to 'the Thing' you've personified the product. Unfortunately, it is still a machine."

"Unfortunately, I still quit." I turned to go, taking a step toward Opal's office. The door slid open.

"OSBORNE," boomed Mr. Winthrop. Opal's startled face looked up from her desk. *"WHEN I'VE FINISHED TALKING TO YOU, YOU MAY DO ANY DAMN THING YOU PLEASE, BUT NOT UNTIL THEN. NOW COME BACK HERE."*

Opal, her jaw slack, watched me turn and re-enter the office. The door closed. Mr. Winthrop took several deep breaths—full, yogic breaths—calming himself. Finally, he spoke, his serenity restored.

"I take it you find my invention objectionable."

"No, diabolic."

The word annoyed him. "Don't play with words, Osborne. Just get it off your chest."

"Good idea. You're going to use that damn thing in the Wentworth campaign. I don't want to have anything to do with it. I quit."

"You're repeating yourself."

"That's commandment number ten, isn't it? Repeat, Repeat."

"If you quit—"

"I do quit. I am quitting. I quit."

"If you quit, I guarantee you will never have a use for any of those commandments in California."

"I've always liked Alaska."

Anger flushed his face. His fist bounced once on the table. "*Damn* it, Osborne, I don't know what in Hell's name is the matter with you. I give you the biggest plum to come through this office in years and you get—I don't know *what* you've got, but whatever it is, it's unprofessional."

"Scruples."

He laughed, a snorting laugh, repeating the word. "Scruples. That's the silliest thing I've ever heard." He thought a moment, looking at me. "All right, Osborne, how much of a raise do you want?"

"I don't want a raise."

"What *do* you want?"

"First of all, I want that *thing* put back in the closet you dragged it out of. But since that's not going to happen, I want off the Wentworth bandwagon."

"Impossible."

"Then I quit."

He mulled things over, looking at the projector, his desk, me. "I may have misjudged you, Osborne. I don't think so, but I may have. I think you are a man after my own heart, a man who likes a challenge. So I'm going to give you a challenge. You go to San Francisco—"

"No."

"Don't interrupt."

"I'm no longer employed here. I'll interrupt if I feel like it."

"Don't be childish. Go there, get the lay of the land. If you can think of a way to market Tony

Wentworth—a successful way—without using the projector, I'll put it back in the closet. How's that?"

I thought about the proposition. If I quit, Mr. Winthrop would use his projector. He would sell Tony Wentworth to California like he had sold me Burgher Beer. The idea chilled me. On the other hand, if I stayed with the campaign, worked from the inside, tried to find some alternate way to make twenty-five million California voters love Wentworth—or at least vote for him—I might be able to serve broader interests than those of a single client. If I had to elect a Republican to do it, so what? In politics, I was beginning to realize, there were worse things than Republicans.

"If I can do it, sell Wentworth," I said, wanting one final assurance from the W, "you'll keep that thing out of the campaign."

He nodded. "Yes, if you can do it."

"It's a deal."

"Call me tomorrow afternoon, Osborne."

3

Mr. Lewis was just in here. He read over what I had written, frowning more deeply the longer he read. He finished, looked up—shaking his head in annoyance—and said, "*I* don't care about Wentworth's aunt's maiden name either. *Or* Winthrop's. Please, as you say, get to the important stuff, Mr. Osborne."

Mr. Lewis, what *you* consider important and what *I* consider important are two separate things. I want you to have a clear picture of Tony, at least as clear as my picture of him. If I fail in that, I've left out the "important stuff."

I got my first look at Tony—and Carol—the day after my discussion with Mr. W. I took a commuter flight to San Francisco. Carol, Tony's wife, met me at the airport. Waiting for my suitcases to pop onto the baggage carousel, someone touched my arm. I looked around. A brunette in Levi's and a brief red blouse smiled at me.

"Mr. Osborne?"

"Yes."

"I'm Carol Wentworth."

She looked twenty-six instead of thirty-six, both her face and—following her across the short concrete ramp to the parking area—her figure, clearly accented by the worn Levi's and bare midriff.

I stowed my suitcases in the back seat of her station wagon and got in. We left the airport and drove toward San Francisco, talking about my flight and my previous visits to San Francisco. She asked whether I had ever seen Tony "in action."

"Just on the cube."

"He's speaking at a park dedication today. We'll stop by there. Tony puts on a good show."

The last comment I discounted.

Wives are seldom good critics of their husband's performances. "But you're missing the show. I thought political wives went everywhere with their husbands."

"Some do." She changed lanes, avoiding the steam cloud behind a bus. "I try. But Tony keeps up a hectic pace."

"It'll get worse before you drive this wagon up to the Governor's Mansion."

She laughed. "I'm sure of that. Tony's father says Woody Winthrop has some kind of invention that will help with the traffic between here and Sacramento."

"It's some kind of invention all right."

"Can you tell me about it?"

"I hope it won't be used."

"What does it do?"

"Invades privacy, among other things."

A slight frown appeared on her face. "How can that help Tony?"

"Good question. Mr. Winthrop will have to give you a good answer. I'm just his man on the spot."

On the spot. It described how I felt as much as where I was. If Carol's questions, mild compared to those Tony would probably ask, disconcerted me, how would I look later, mumbling and stumbling, trying to explain why I opposed my employer's methods? Why did Mr. W *want* someone who opposed his methods as liaison man?

Aside from the general discomfort of the situation, Carol's occasional glances at me, both in the airport and the car, made me feel on the spot. They contained something more than polite attention. Pulling off the freeway in San Francisco, the "something more" spoke.

"You're a handsome man, Mr. Osborne."

"Thank you. You're a handsome woman. You're not making a pass at me?"

"No. Just an observation."

The observation hung in the car, stimulating inappropriate fantasies, until we reached a park. We began a slow circle of it, searching for a parking place. A bandstand, surrounded by a large crowd and decked out in red, white and blue crepe paper, came into view. Someone paced it, holding a microphone in one hand and gesticulating with the other, pounding home some point. Carol nodded toward the figure.

"Tony."

We found a parking place and left the car, starting across the grass toward the bandstand. Near us on the street, a van rolled to a halt, its turbine dying, double-parked. The side doors, conservatively lettered KQIK NEWS, split. Two men emerged, one carrying a stereo remote camera and the other a microphone. The man with the microphone recognized Carol, waved and shouted, cupping his hand around his mouth.

"Has your boy done his number yet, Mrs. Wentworth?"

Carol, annoyed, gestured toward the bandstand. *"Your eyes are as good as mine, Dunnigun."*

The reporter, noticing her annoyance, grinned, shielded his eyes with his free hand and made an exaggerated search of the horizon, eventually stopping at the bandstand. He glanced back at Carol, shouting, *"I hope he's easier to find on the ballot."*

"Jerk," commented Carol, ignoring him, continuing across the grass.

"What was that all about?"

She shook her head, disregarding the incident. "Just Dunnigun's little joke. Dunnigun is—how can I put it tactfully—somewhat reactionary. He would prefer to get back to what he calls the Basics of the American Character. That's what he calls his nightly editorials."

"What kind of basics?"

"The Articles of Confederation, probably."

We reached the back of the crowd. Tony, still reduced to a bulky stick-figure by the distance, continued his speech, holding the microphone and pacing the platform. He gestured first with one hand, then with the other, deftly shifting the microphone from hand to hand. Without breaking either stride or sentence structure, he unbuttoned his collar and loosened his tie.

In spite of my late arrival, putting me into his speech between two details in some incomprehensible tax reform argument, I found myself unable to take my attention from him. When I managed, I noticed Carol watching me, smiling.

"Good, isn't he?" said Carol.

"Very. Is he always this . . ." I searched for the right word, trying to avoid advertising jargon. The right word eluded me. I fell back on my professional diction: ". . . dynamic?"

"Wait until you see the Jolson finish."

"The who finish?"

Almost in spite of myself, I watched Tony. His presence filled the stage even in the open air. During his senatorial campaign, I remembered nothing like it. I wondered about the contrast.

"Is this a new acquisition?"

"What?"

"The style. It's good."

"No. Why?"

"He doesn't seem like the same man I remember from the cube."

"He's been doing that Jolson-thing as long as I've known him. He used to do it in court with his summations."

"Was he an effective lawyer?"

"Very."

A roar of approval went up from the crowd. Carol and I glanced at the bandstand. Tony, the microphone held above his head like a sword, stood resolute. Whatever point he ended on, he seemed adamant about it. The crowd believed

him. I smiled. Only a pro could get away with that kind of melodrama. Even at our distance, I could tell Tony enjoyed the cheering. Actors usually do.

Another speaker, elderly, hands trembling on his prepared speech, began talking, his voice barely audible even with the sound system. I sympathized with him. He would need a dancing bear to follow Tony.

People drifted away from the bandstand. Carol glanced at me, her expression inquiring whether I was ready to leave.

"What about your husband?"

"We'll meet him at the boat."

The boat, a thirty-five-meter racing yacht named *Carol,* moored in the San Francisco Marina, told me more about Tony than seeing him on the bandstand. Even without the rigging being shaped into dollar signs, the message was clear.

Carol and I walked down the wharf to the gangplank, then crossed to the boat. Unlike most of the larger yachts in the marina, booms wrapped in sailcovers, the *Carol* looked ready for sea. Only a crew was missing.

In the main cabin, Carol prepared coffee. I watched her work at the galley stove, wondering about her relationship with her husband. I kept reminding myself business and women seldom mixed. Even without business, mixing with women like Carol Wentworth was probably a bad idea. Her husband knew too many influential people. In spite of my comment to Mr. W, the idea of working for an ad agency in Alaska left me cold.

She handed me the coffee and sat across the cabin on a locker, rearranging several orange cushions. We talked about Tony, what kind of image the Winthrop and I were going to build for him, how the best images reflect who a person actually is. Talking about Tony's career, she reminded me of a woman rearranging furniture, mentally trying one pattern, then another. Or better yet, a mother imagining her child's future. She sat on the cushions, a relaxed—almost dreamy—expression on her face, and talked about Tony's career. In spite of the pleasure she got from the thoughts, what she said sounded almost clinical, detached, without much reference to Tony as a person. Only once did she show anything like an emotional reaction, rather than an intellectual reaction to a pleasant abstraction. I asked what *she* wanted for Tony personally, not his career.

The dreamy expression disappeared. She thought, then looked at me, her voice—even her face—carrying a quality that inexplicably

reminded me of the Winthrop.

"Mr. Osborne," she said, looking directly at me, "I want Tony to win this election."

Overhead, I heard footsteps on the gangplank. The boat yawed slightly. Tony appeared in the hatchway, backlighted by the afternoon sun.

"Anyone home?"

"Just us image-builders," answered Carol, her momentary intensity gone.

Tony dropped easily down the stairs, collar still unbuttoned and tie loose. He took off his coat, draped it over a chair and glanced from Carol to me. She introduced me.

Before we could say much beyond our names, the gangplank creaked again.

"Father," said Tony. "I asked him over"—he nodded at me—"to hear what Mr. Osborne has to say. He's had a few."

A man in his sixties, heavy-set and gray-haired, started down the ladder, placing his feet carefully and watching them. Reaching the deck, he looked up and discovered himself the center of attention. He grinned.

"You thought I wouldn't make it, didn't you?"

"We knew you'd make it, Father. Why don't you sit over—"

"*Sit, sit, sit,*" boomed Tony's father. "I've been *sit*ting all day." He looked from Carol to Tony, his eyes eventually stopping on me. "You Woody Winthrop's boy?"

"Actually, I just work—"

"Spitting image," he said, thrusting out his hand and taking mine. "John Wentworth's the name."

I said my name. He failed to hear it.

"If you're half as smart as Woody, you'll do all right in this world."

"Thank you, sir, but—"

"It's true. Smart as a whip, that Woody Winthrop. When did he get married anyway?"

"I wasn't aware he—"

"Ahh," said John Wentworth, giving me an understanding wink, "an indiscretion. I see. Doesn't matter what you are nowadays, anyway. Don't feel bad about it for a minute, young man. You're *just* as good as anyone else. *Just* as good."

I gave up trying to correct his misimpression. "I'll remember that."

He walked over and clapped me on the shoulder. "Spitting image."

"Would you like a drink, John," asked Carol, diverting him.

"Drink?" He looked around, eyes bright. "Did someone say drink?"

While John Wentworth had been assuring me my parentage no longer mattered in a sophisticated world, Tony had touched on the holovision. A miniature flood raged inside the cube.

"Let's see what Dunnigun did for us today," said Tony.

"Or to us," added Carol. "I don't know how you can stand that man, Tony."

"He's always been fair with me, hasn't he?"

She handed Wentworth Senior his drink without answering Tony.

The flood disappeared, replaced by Dunnigun, seated at a table inside the holocube. Tony turned up the sound.

". . . In other news today . . ." Dunnigun faded. The park bandstand appeared.

"Now I'm only 'other news,'" complained Tony.

". . . State Senator Tony Wentworth, speaking at the dedication of the new Petrero Park clubhouse, called for state tax reforms to match those of New York and Minnesota . . ." The camera zoomed in on Tony, who paced the stage and gestured to punctuate his words.

". . . *The inequity and injustice of our present state tax system should make the Governor blush. It is neither fairly conceived nor fairly applied. The rich pay not only a smaller percentage amount in taxes but a smaller per capita . . .*"

The more I watched Tony on camera, the less I understood. Watching him, I felt restless, inclined to turn my attention away from the cube. At first, I thought having heard the speech in person accounted for my lack of interest. I forced myself to watch, hoping to pick up more pointers on Tony's style.

I noticed my reaction more than his style, a neutral, even negative, reaction. The little figure striding the stage, waving its arms, reached me with none of the energy I had felt that afternoon. None of the personality came through. Somehow, holovision filtered out Tony's best quality. He seemed like a man mouthing words, words I neither cared about nor heard.

I remembered Tony's election statistics, his appeal shrinking as he drew on a larger constituency. A larger constituency, harder to meet personally, meant relying on the media and people like Dunnigun.

I excused my way past Tony's father, his attention rapt by the tiny replica of his son, and stood next to Carol.

"Tell me something, Mrs. Wentworth."

"Sure."

"This *is* the newsman we met at the park."

She nodded. "If you can call him that."

"How did he treat Tony in the last election?"

"Good question. It's bothered me ever since. He was fair with Tony."

Dunnigun, severe on everyone else in the campaign but Tony, had covered Tony's public appearances thoroughly and completely, running extensive excerpts from his speeches without comment. Even someone named Otis, the man in

the campaign closest to Dunnigun's own views, got short coverage and critical commentary. Tony had a standing invitation to "Dunnigun Versus," a Saturday evening public affairs program with a debate format. He accepted the invitation four times during the campaign. Each time, Dunnigun seemed delighted.

"How does Tony come through on other stations?"

She nodded at the cube. "About like that."

"And on television?"

"The same."

I watched the cube, noticing the camera work, a medium distance shot of Tony on stage without any cross-cutting or voice-over. The image faded with Tony in his Statue of Liberty stance, microphone aloft. In person, it had been effective, resolute. In the cube, it looked pretentious and annoying.

A commercial followed, catching my attention. A holographic cartoon dog ate and spat out half a living room full of furniture, searching for a meal. I laughed aloud. Carol gave me an inquiring look.

"Sorry. Professional interest."

The dog's owner, represented by two female legs and a knee-length skirt, gave it Dem Bones, a dry dog food. The dog, its maw gigantic, filling the cube, swallowed Dem Bones, box and all, then smiled, contented. A chorus chanted, "Dem Bones, Dem Bones, Dem . . . dry Bones." Tony shut off the set. Too bad. I wanted to place the ad agency who did the commercial. Mr. W—always ahead of his time—had commissioned the first holographic cartoons.

"Ten minutes," said Tony, beaming. "Ten minutes of prime-time coverage."

"Good speech, son," said John Wentworth, his voice deep and paternal. He walked in front of me and refilled his glass at the counter.

Tony looked at Carol.

"It was a good speech, Tony," she said. I could interpret nothing from her tone of voice.

Tony looked at me. "You're our media man."

I felt uncomfortable. Lone dissenters usually do. I tried to soften the effect of my opinion. "I saw it in person. That might have taken away some of the impact."

Tony frowned, shaking his head. "You didn't like it."

I equivocated. "It was all right, I suppose. A few things bothered—"

"The truth," said Tony, his expression drained of its earlier good will.

I looked from face to face, stopping at Tony. "It stunk."

In the silence, I could hear the boat creak. I imagined myself walking the plank from the top of the Winthrop Building. I could feel the Winthrop prodding me with a sword, saying, *You told him it stunk, Osborne! Off the edge with you!*

"What," asked Tony, his voice quiet and controlled, "exactly, do you mean by that?"

"You came across like an old movie."

"You mean my style is dated."

"Not exactly. This afternoon, I literally could not take my eyes—or ears—off you. You could have been talking about the dangers of tooth decay. It didn't matter. You kept my attention and your message came through. You had the crowd in the palm of your hand."

Tony relaxed.

"But," I continued, "and it's a *big* but, in the cube, you bored me stiff."

"You don't care about tax reform."

"It wasn't the content. It—"

"If you'd pay attention," said John Wentworth, scowling, "like you're paid to, you might *care* about the content of my boy's speech." He looked at Tony. "Don't listen to him, son. It was a good speech." He looked at me. "You're not getting paid to bad-mouth my boy."

"I wasn't bad-mouthing anyone. And attacking me isn't going to solve anything."

"Neither is talking nonsense," snorted Wentworth Senior. He pushed the button on the seltzer bottle. It fizzed into his drink.

I shrugged. "The hell with it."

"No," said Tony. "Go on."

"*Tony,*" insisted John, "the man's an idiot. Don't listen—"

"Father, please be quiet."

Grumbling something about Woody Winthrop's offspring being a cretin, John Wentworth started, silently, on his drink.

"Nothing came through on HV," I said. "None of your personality. It was like watching one of those Tyrone Bogart pictures in two dimensions and black and white."

"What do you mean by personality?"

"Energy, immediacy. Something like that." An idea occurred to me, an illustration. I looked at Carol. "Mrs. Wentworth, what was the idea in your husband's speech, not the exact words, but the idea?"

She thought a moment. "That with a Republican Governor, tax reform would be a reality."

Tony, startled, looked at her, "Carol—" He broke off and looked at me. "Do *you* know?"

Fortunately, I remembered. "It had something to do with an initiative proposal you want to get on the ballot."

Tony looked at his wife. "Carol, why didn't you know that?"

"It must have slipped by me, Tony."

"Slipped *by* you! Christ, it was the whole *point* of the speech."

I interrupted. "Mrs. Wentworth, what was the commercial just after Tony's speech?"

"I don't know—dog something. A dog eating a house or something." She thought, index finger raised to her lips, gazing past us at the over-

head. "No. Dem Bones, that dog food stuff."

"*Carol,*" said Tony, irritated. "How the hell can you remember some damn *dog* food and not the point of my speech?"

"That's what I meant," I said, "about not coming across on holovision."

Carol, thinking about the exchange, looked at me. "Tell Tony about Dunnigun."

One step ahead of me, she had considered my objections to Tony's holovision presence—or lack of it—and applied them to Dunnigun's willingness to let Tony on the air at the drop of a hat.

"Tony, have you ever wondered why Dunnigun was willing to give you as much air time as you wanted?"

"He likes me. Even our debates went off well."

"The studio audience liked you."

"Yes."

"Did you ever watch a tape of the show?"

"Once or twice. What are you getting at?"

"Dunnigun probably noticed you don't come over on holovision and decided to let you hang yourself."

I watched Tony's face. For the first time, he considered my suggestions seriously. Evidently, he had wondered about Dunnigun's generosity. He seemed to come to some kind of conclusion.

"You're not going to listen to this load-a crap, are you, Tony?"

"It may not all be—" began Tony.

"Load-a crap. You can't sell people like you sell dog food. People, at least the people *I* am used to associating with, are not dog food. And my son has *never* been dog food."

Tony, ignoring his father, glanced at Carol. "What do you think?"

"He may have something," she said.

"Load-a crap's what he's got."

Tony looked at me. "What do you suggest?"

Only one answer came to mind, Mr. W's projector. With the answer, I realized the extent of the Winthrop's duplicity. He agreed to shelve his projector if I could come up with an alternate method of selling Wentworth, he agreed knowing he had a sure thing. None of the traditional methods of advertising could overcome Tony's problem. I had fallen victim to one of the oldest ruses in the advertising game, being convinced I was getting a fair shake of loaded dice.

"You *do* have a suggestion," said Tony.

"I suggest we call Mr. Winthrop. Do you have a phone?"

4

The phone, a decorative model—spherical with the screen in front and pushbuttons on top—had been stowed in a locker. Tony retrieved it. I pulled up the stubby antenna

and punched out the Winthrop's office number. Opal, after a brief pause to relay who was calling and from where, put me through to the Winthrop. The screen flickered and settled.

"Mr. W?"

I had expected the Winthrop's face. Instead, I got a shot across his office. On top of a pile of ten or twelve randomly heaped pillows sat the Winthrop, a high-collared coat of some kind buttoned to the neck, legs full lotus, hands resting lightly on his knees, the ad man guru. The projector stood on the table above him, man and machine, or perhaps mother and child.

"Is that you, Mr. W?"

"Aaaaaaaaooooooouuuuuuumm mmmmmmmmmmm," exhaled Mr. W.

"Pardon me?"

"Aaaaaaaaooooooouuuuuuumm mmmmmmmmmmmmm."

"That's what I thought you said. Mr. W., are you well?"

The head nodded forward, the eyes closing on the downswing and reopening on the upswing. "I am well, Roger."

Roger? My first name. A new high in my relations with the Winthrop! Still, I felt compelled to puncture whatever he thought he was doing with the pillows and posture. "Glad to hear it, chief."

"Do not, Roger," said Mr. W, spacing his words, speaking slowing, giving his rendition of the voice of wisdom, "call me chief. Are the Wentworths with you?"

"They're right here, chief."

Momentary irritation surfaced and faded on the short Buddha. "I will speak with them."

I walked away from the phone, muttering, "You're on, baby."

"What was that, Roger?" said the voice, languorous, almost ethereal.

"Nothing. They are—I mean, they're listening, Oh, Holy One."

I retired to the rear of the cabin to watch the Woody Winthrop Variety Hour. Tony introduced his wife. The Winthrop nodded solemnly.

"Gentleman," he said, "and Mrs. Wentworth, I have been analyzing the tapes of Senator Wentworth's previous campaigns. I expect the problem I have noticed is one familiar to you, or at least one brought to your attention by Roger. Before I demonstrate what I consider to be a possible solution to it, let me briefly review the more traditional approaches to political advertising. First . . ."

I quit listening. I knew most of the approaches, traditional or otherwise, to advertising. I wanted to watch guru W's audience for reactions. I expected severe negative reactions. Few swamis tread the corridors of power. No one reacted. Slowly, I realized why. My first impression—that the Winthrop intended some sort of Variety Hour, complete with juggling seals and the star contortionist—had been wrong. Whatever it had been, the

show was over. This was the commercial. Like any good commercial, it followed Winthrop's commandments, particularly the first—get their attention. They watched the ad man guru, rapt.

". . . the last method strikes closer to our problem. Roosevelt's fireside chats, Kennedy's press conferences, Malone's living room discussion—all had one thing in common. Each man knew how to use the mass media of his time in such a way that an intimate personal impression got across and with it the man's views and opinions. We have problems in this area."

John Wentworth gurgled, cleared his throat and spoke. "Load-a crap's what we've got."

"Pardon me, John?" said Mr. Winthrop.

"Nothing."

"Now we come to my suggested solution," continued Mr. Winthrop. He stood and walked forward, reaching toward the phone. He carried it back to the telethesia projector. Somehow, the projector looked less sinister than usual. I squinted, examining it closely. The parabolic reflector, the device's most personifying feature, had disappeared, replaced by a square tube. The tube ran from the top of the projector toward the phone and out of the picture.

"As John will tell you," said Mr. W, "my background, principally in advertising, includes substantial familiarity with electronics. Combining the two interests, I have produced this device, a telethesia projector. I would like . . ."

Something new had entered Mr. W's voice, new to the discussion and new to me. His usual air of indifference, his take-it-or-leave-it attitude, had vanished. The Winthrop wanted his projector used. He actually cared about his client's opinion. I imagined the look of shock on Opal's face when I proved, conclusively, the Winthrop's essentially human, as opposed to Martian, nature.

". . . and to conclude with a demonstration, I will use the tape I prepared with Roger's help."

The Winthrop touched on the hologram recorder by the projector. Tape slid past the playback beam. The image of a Burgher Beer bottle formed in my head, followed by an image of the valve in the neck. Somehow, the Winthrop had connected his machine to the phone, projecting the image of the Burgher bottle six hundred and fifty kilometers. Knowing, roughly, what was happening, I could counter the effect, pushing it to the back of my mind like a recurrent melody.

I looked around the cabin. The bored expression encouraged me. Perhaps Mr. W's tape, designed to demonstrate his projector to me, would be ineffective on anyone else. Momentarily, I felt the sway of the boat. Owning a boat had advantages. Swimming, for one. If I owned Wentworth's boat, I could

attach a rubber raft to the taffrail—whatever a taffrail was—and float on it, my bottle of Burgher bobbing next to—

I shook my head, submerging the thought. Evidently, the Winthrop's projector relied on the customer's own memories to produce some of its effect. When the W first demonstrated it to me, I had thought of the pool at my apartment building. Now, I thought of the boat. I admired this sinister personalizing touch.

The tape ended. Mr. Winthrop repositioned the camera, staring into it at close range. John Wentworth yawned and stood up, stretching and talking through his yawn. "'nough ah 'is crap."

His mouth closed. He stepped across the cabin to the counter and surveyed the bottles, distaste evident on his face. "Carol, honey, I'm sick of this Scotch. Do you have any beer?"

Almost simultaneously, Tony spoke up, indicating a desire to join John Wentworth in a beer.

"Burgher," said Tony, "if we've got any."

Mr. Berger would have been proud. I felt sick. The Winthrop grinned and relaxed. He knew he had them.

Beer, none of it Burgher (to my relief and everyone else's disappointment) was produced from somewhere forward. Tabs were pulled and caps snapped. Their thirst satisfied, they returned their attention to Mr. W. Tony spoke first.

"You said something about a demonstration."

"How's your beer?" The Winthrop's tone showed none of its earlier worry.

"Fine. What's that got—"

"You'd prefer a Burgher."

"Yes, but—"

The Winthrop started into his technical discussion, Alpha and Theta rhythms, induction, modulation, projection. He concentrated on the method of preparing the tapes, an initial recording to establish the basic images (bottle, valve), followed by a second recording, working his way through the emotions he wanted stimulated in the consumer, orchestrating the tape.

"But what does it do?" asked Carol, bewildered by Mr. W's jargon.

"It advertises," I said. "Inside your head. It's set up for beer right now. Mr. Winthrop wants to set it up for Tony."

My explanation, succinct, sunk in with everyone. I watched Tony especially. He frowned, thought, shook his head, then looked at Mr. W. "No, I'm afraid we can't use a thing like that."

John Wentworth, evidently following the conversation in spite of the liquor, approached Tony, putting his arm around his son's shoulder. "Tony, you have to move with the times."

Tony nodded at the phone. "Not

those times. That thing coerced me into wanting beer. How can you use a thing like that on voters, ethically?"

"Son," said John Wentworth, his tone mildly disappointed, "this is progress. You can't stop progress. It marches forward with or without you. You're either with it or . . ."

"Against it?" I suggested.

"I was *going* to say left behind," said Tony's father, talking to me but looking at Tony. "And the Wentworths are never left behind."

"Tony," said Carol, "it can win the election."

"She's right, son. This is politics and politics is hell."

"I thought," I said, "it was war that was hell."

"Same thing."

Tony shook himself free.

"Senator," interrupted the Winthrop, "How do you feel about Burgher Beer now?"

Tony shrugged, indifferent.

"Would you buy some?"

"Probably. I've never tried it."

"But you don't feel compelled to buy it."

Tony thought several seconds, introspective. "That's a difficult question. I know, generally, how the desire got into my mind, so I can control it."

"Take my word for it," said Mr. W. "It's the same even if you never heard of a telethesia projector. I've tested it. Only during the time the message is being delivered is there any compulsion involved. Beyond that, only the message remains. You can make up your own mind."

I could see the old Winthrop shining through the new guru, juggling phrases. He made the projector, delivering its message, sound as harmless as the mail man.

Tony shook his head. "No. We're not going to use it."

Carol started to say something. Tony cut her off.

"I don't care what it can do, Carol. We're not using it."

I began to admire Tony Wentworth. He had his career to lose, his future, years of accumulated hopes. Still, he said no.

"I'm sure," I said, "we can work out a conventional advertising campaign instead of—"

"On the contrary, Roger," said Mr. W, "it would hardly be worth doing as a conventional campaign." He looked from person to person, skipping me. "That's all we have to offer, Senator. A conventional campaign, other than as a supplement to using the projector, is out of the question. If it doesn't interest you, I'm sure there are others—"

Mr. W let the sentence dangle, playing his hole card—others. Governor Webster. Until that moment, I suspected Mr. W of latent Republicanism. I had been wrong. He was ad man through and through, apolitical, prepared to offer his services to anyone who would take them, but on his terms. He had picked Tony as the weakest gubernatorial candidate, an ideal demon-

stration of the power of his projector. If Tony rejected it, there were . . .

"Others," repeated Tony and smiled, the political realist in him re-emerging. He had considered the projector only as a weapon for his side. It had a double edge. He nodded.

"I'll think about it, Winthrop. I'll send word back to you via Osborne."

"Who's Osborne?" asked John Wentworth.

"Fine," said Mr. W and hung up. No good-bye, just click, dead screen.

John Wentworth lurched across the cabin and put his glass on the counter. "Tony"—he swayed, suppressed a belch, and continued—"sleep on it." He started toward the ladder. "Show's over, kid," he said to me. "Take me home—I mean, I'll take you home."

"I'll contact you within the next few days," said Tony, shaking hands with me.

5

Now I have to write about the beginning of my love affair with Tony's wife. It is the most difficult part for me to write. But without Carol, I would have left the campaign.

After a ride to my hotel with John Wentworth (he bounced over curbs on two right turns and almost ran down the boy who parks cars in front of the hotel), I went up to my room convinced I would quit. Mr. W had reneged on his promise to try a conventional campaign for Tony. At the time, I failed even to ask myself why he sent me in the first place. He knew I opposed the projector. He knew I would quit if he used it. I shrugged off the question, assuming he thought I could be convinced to stay once I became involved.

I had been at the hotel long enough to clean up and begin thinking about dinner when Carol called. She wanted, she said, to talk to me. The hotel's phone had so much static on the screen her expression was hard to read.

I asked whether Tony would be coming, too.

"No. Tony's on his way over to Sacramento to talk to some of the Party people. He won't be back until tomorrow morning."

Tony, it occurred to me, had evidently made up his mind about the projector. Since he thought my opinions matched the Winthrop's and probably wanted to avoid an argument, he was sending his wife with the bad news. Fine with me. If Tony rejected the machine and Mr. W rejected Tony, I could decline the honor of acting as liaison man for the next politician on Mr. W's list. I would be off the bandwagon and back on the beer truck.

We made arrangements to meet downstairs. Carol suggested dinner.

We drove to a restaurant near the beach, a pizzaria called "Vi-

torio's." Carol, her Levi's and blouse replaced by a splotchy-patterned knee-length dress, sidestepped me when I brought up the purpose of our meeting. When I asked directly, she said, "Can we postpone that? I'd like to get to know you a little better."

A cab slowed in front of us, preparing to double-park. She swerved around it, the instinctive reaction of an accomplished San Francisco driver.

I wondered, when we finally parked the station wagon and started up the sidewalk toward Vitorio's, what getting to know me had to do with telling me Tony's decision on the projector. Entering Vitorio's, I decided to postpone wondering, too. The prospect of dinner with a beautiful woman does a lot to dampen wondering.

Vitorio—blond, Swedish-looking with an armful of large menus—showed us to a booth in a rear alcove. Somewhere, either live or recorded, something played music thought to be Italian. Vitorio seated us, presented us with menus and left. On the wall opposite our booth, a mural—mostly water and moonlight—attempted to depict Naples or Venice. A giant moonbeam, reflected on the water, illuminated a minute object, presumably intended to represent a gondola or a small whale. Carol noticed me inspecting it.

"Don't worry, Roger, the food's good."

"How does your husband feel," I asked, pulling my eyes from the mural, "about you having dinner with strange ad men?"

"Tony's in Sacramento."

Tony's in Sacramento. Somehow the most obvious explanation of the phrase—husband out of town, wife entertains strange ad man—seemed unlikely. How could sex alone, even with a temptingly handsome younger man, be worth the risk? It couldn't.

Still, by the time the pizza arrived, thick wedges transferred expertly from the platter to our plates by Vitorio himself, my predatory instincts—along with my hormones—had been aroused. Almost involuntarily, I weighed my chances. Weighing them, I still came up a lightweight.

On the one hand, she had a State Senator, a lawyer and potential gubernatorial candidate, money, leisure, a life she enjoyed. On the other hand (not quite in the palm of the other hand) stood Roger Osborne, handsome (true), suave (true) loving (under proper circumstances), but still Roger Osborne, ad man. From her point of view, the risks outweighed the rewards. Yet some women, I consoled myself, liked risks.

"You're losing ground," said Carol.

"Hmm?"

She indicated the remaining slice of pizza.

"I'm getting full. Do you think we could talk business?"

She daubed at her mouth with a napkin, nodding, chewing.

"Is Tony going to use Mr. W's projector?"

"I'm not sure." She pointed at the platter between us. "Can I have that if you're not going to eat it?"

"Sure. Do you have any idea what Tony thinks about it?"

"Some. I think his opinion is about the same as yours. He'd rather not use the projector, but if it's used, he wants to make sure it's used properly."

"How do you know my opinion?"

"I talked to your Woody Winthrop." She bit into the wedge of pizza. Cheese dropped from her chin to the slice. She took another bite, this one clean.

"I thought your husband had already decided against using the projector and you were assigned to bring me the bad news."

She finished the pizza and licked her fingers. "No. Tony will tell you himself."

"Then why are we having dinner together?"

"Maybe I just like having dinner with handsome men."

Maybe. Somehow, I doubted it.

She reached for the check. I reminded her of Mr. W's expense account. I paid and scooted out of the booth, then helped her into her sweater.

"Can I ask a rude question, Carol?"

"As long as it's not too rude." She turned, bundling her sweater at the throat with both hands.

"I think you are an attractive woman . . ."

"Thank you."

". . . I keep getting boy-girl messages from you."

She waited, looking at me. "Yes."

"That's what I thought."

Leaving, I took a last look at the mural. The object in the moonbeam (gondola? whale?) could have been a ship, sinking.

I got back to the hotel at quarter to four. I had not yet fallen in love with her, though I teetered. I tried to sort out my impressions, both of Carol and the situation I saw opening in front of me. Before I left the boat, she had looked at me, her expression genuinely inquiring, and said, "I wonder what you think of me."

I had started to say something innocuous, but she interrupted, telling me about her "other affair." After the stillbirth of their daughter, Carol had noticed a change in her relationship with Tony. She wanted emotional support, some response to help her deal with her sense of loss. Tony, probably having his own problems coping with the loss, had failed to respond. Someone else—she never said who—had responded. Telling me, she smiled, a weak smile at painful

memories, and said, "I was a little old for an identity crisis, wasn't I, Roger."

"You don't really have to talk—"

"I want you to under*stand*, Roger, to understand me. Twenty-five was a little old, wasn't it?"

"I don't think it's like chicken pox. Adults get it, too."

"It could happen again."

"I doubt it. Those things usually—"

"If Tony lost, it could happen."

"If Tony lost," I said, hoping a joke would change her mood, "it could happen to Tony."

She answered seriously. "No. He's really very good. I think he can take anything. It could happen to me."

Reflecting on her comments that morning in my hotel room, I attributed them to guilt at having the affair. Over the next week, we saw each other frequently and the impression was strengthened. Only once during the days we spent together did she edge toward the subject again. Still, it was enough to let me see what Tony's career, since their daughter's stillbirth, had come to mean to her.

Tony had taken the boat out with some political friends to mull over his decision on the projector. Carol and I had gone out to Golden Gate Park to spend part of the afternoon. By then, I knew I had fallen in love with her. I kept feeling the time we spent together was an isolated incident in our lives. I wanted something more permanent. I had tried to bring up the subject several times. Each time, Carol avoided it, preferring to let our ambiguous situation stand.

We sat on a knoll overlooking a baseball diamond and watched a local team practice. I tried to bring up the subject again.

"Carol, let's go somewhere together."

She lay back on the grass, head propped in her hands, staring at the overcast sky. "Where?"

"Europe, maybe."

She shook her head. "Too crowded."

"OK, anywhere."

"You know what I *would* like to do?"

"What?"

"I'd like a farm."

"If you want a farm, we'll get one."

"With goats. I've always wanted a goat."

"If you want goats, I'll get you some goats."

"And chickens. They're stupid, but I like chickens." She looked at me. "A rooster, too, of course."

"Right. One rooster. You don't want a woolly mammoth or anything like that, do you?"

"No. They track up the house. But a horse would be nice."

"Goat, chicken, rooster, horse," I said. "No woolly mammoth."

"Roger." She continued staring at the sky. "Could we do that?"

"Sure."

"And what about Tony?"

"Leave him."

She remained quiet several seconds. I looked down at her, her head still propped in her hands. She shook her head slightly. "I can't, Roger."

"Why?"

"I just can't. I don't think I'd be anybody at all without Tony. I'd just disappear." She looked at me, trying to smile. "Like the woolly mammoth."

"What if Tony lost the election?"

"Then"—she thought a moment—"then maybe I could. I'm so afraid we're going to lose it."

During the time Carol and I spent together, I began to understand the meaning of those two conversations. At first, I thought I was the odd-man-out in a love triangle—me, Carol, Tony. Gradually, I realized Carol and Tony had stopped loving each other long before Roger Osborne appeared on the scene. My true rival, the "other man" who kept Carol with Tony, was his career. Her feelings, her identity, her image of herself, were almost inextricably jumbled together with his career.

Once I understood this, two things became clear. If I followed my own convictions against being involved with the projector, if I left the campaign, I left Carol. I lost all hope of any permanent relationship with her. She would never leave Tony before the election.

On the other hand, if I stayed with the campaign and they used the projector, Tony would certainly win and Carol would stay with him. I could see no way out of the situation. Too bad, Roger—heads you lose, tails you lose.

These thoughts, along with one not fully realized until Tony told me his decision on the projector, made me a very unpleasant person to be around. My normally—what, frivolous?—nature had been caught in a pincer, my feelings for Carol confronting my convictions. I was becoming—much to my annoyance—as serious a person as Tony or Carol or even Mr. W.

The following Thursday, Tony left a message at my hotel. He wanted to see me at the boat. I took the Hyde Street cable car to Fisherman's Wharf and walked to the Marina. The *Carol*, more securely battened down than on my first visit, lay in its slip. Crossing the gangplank, I began to feel my apprehension about meeting Tony. I kept wishing he would simply disappear and leave me with Carol.

I found him aft, red-faced from almost a week at sea, sitting in a captain's chair, drink in one hand, one deck shoe on the rail, staring out at the bay. He either failed to hear me or preferred to ignore me.

"You'll freeze to death out here," I said.

He looked around, then held up the glass. "Antifreeze. Want one?"

I declined the offer and sat down

in the chair next to his. Across the bay, the vague outline of Marin County showed through the long finger of fog reaching in from the sea.

"Good trip," said Tony, watching the fog envelop more and more of the Golden Gate Bridge. "I hated to come back. We had to beat back up the coast most of the way. It was still a good trip. The sea clears your head. I went a day and a half without thinking about politics."

"A new record?"

"Close." He looked at me for the first time. "Carol said she talked to you while I was gone."

"Yes."

"She said you don't like the idea of using Winthrop's projector in my campaign."

"In any campaign."

"That's an odd position for one of Winthrop's employee's to take."

"Advertising makes strange bedfellows."

He nodded without smiling. Something—some momentary thought—showed in his eyes, then vanished. I suspected I had chosen the wrong aphorism to paraphrase.

"I talked over using the projector with Carol," said Tony. "She wants to use it."

"I know." I looked around the boat. "Is she here?"

"Below. I want your opinion on what I should do. The projector *will* be a political weapon in this campaign, Osborne. The only issue I can see is whose side it will be on, mine or Webster's. What would you do in my situation?"

I had the feeling he already knew what he would do in his situation. I hedged, shrugging. "I'm not in your situation. Have you made your decision about it?"

"Don't worry about my decision. I want your opinion."

I looked out at the bay. Most of Marin County had disappeared in the fog. Only Alcatraz, the lights of the amusement park blurred and fuzzy, showed in the gray. I was the wrong person to answer. I had an axe of my own to grind. Still, Tony had asked my opinion. As long as I was indirectly on the payroll, I owed him that much.

"If you use it," I said, "you'll win. I don't think there's much question about that. If someone else uses it, you could fight it in court."

"And lose the election."

"Not necessarily. The court fight itself might be good for the campaign."

He turned sideways in his chair, watching me closely. "As I understand the device, it has two applications, the direct control of conduct and the latent effect, the advertising effect, left over after the initial impact. Is that correct?"

I nodded.

"Which of these do you object to?"

I felt like I was being cross-examined. "I don't like the whole thing. If someone walked into a

voting booth just after being exposed to it, they would vote for Genghis Khan."

"But if a little time had passed, a candidate—once his message got across—would still have to stand or fall on his own merits."

I could see his lawyer's mind at work, splitting hairs to get the result he wanted. "Probably."

"So the real issue is *how* the projector is going to be used, to stuff the ballot box or get across a rational argument and let that argument determine the vote."

"Yes, but—"

Carol stuck her head out of the hatchway, interrupting me. "Hey, you two, why don't you move the party inside. It's cold out here."

"Very," I said.

We left our chairs and went below. At the foot of the ladder, Carol handed us each a martini. Thinking about Tony's argument, I was struck as much by his shift in attitude as the content. When he first heard of the projector, he reacted on moral grounds. I remembered seeing a genuine struggle on his face. But on deck, his arguments had been reasonable, rational, logical, a lawyer's approach to problems, apparently devoid of moral considerations. At some point during his cruise, he must have accepted the idea of using Mr. W's projector. The thought bothered me.

"Roger wants me to tell his boss I won't use the projector," said Tony.

Carol, kneeling at one of the lockers and stowing something, her back to Tony, caught my eye, frowning.

"You don't like that idea, do you, Carol?" continued Tony, aware of her reaction without seeing her face.

She answered without looking around. "No. I think it's foolish not to use what's available. But the decision is yours, Tony."

His face took on an expression I had seen once before, the expression I noticed when Mr. W produced the stick after the carrot failed, the ironic self-mockery of political realism. "The decision is mine." He let the sentence stand a moment. Carol, probably recognizing his tone of voice, glanced around.

"It is mine, isn't it, Carol?"

"What do you mean?"

"Haven't you and Winthrop and probably my father, and for all I know, Osborne here, set this thing up so I can only make one decision?"

Carol stood up. An unexpected wave from the bay jostled the boat. She steadied herself against the bulkhead. "I don't understand what you mean, Tony."

"Carol," he said, his voice louder, "I'm not naive, politically or"—he glanced in my general direction—"otherwise. If I reject Winthrop outright, he takes the projec-

tor to Webster. If I fight that in court, not only do I spend what money we have but the big political money dries up. Even if I won in court, I'd have to get a loan to cover the filing fee. If I lost, it would be money down the drain, politically speaking. The other alternative is using the projector, and that—did Winthrop spell all this out when you talked to him, Carol?"

She seemed startled by the question.

"You did talk to him, I see. I wondered. No, he wouldn't spell it out. He's too good a salesman to do that. He let you put two and two together like I've been putting two and two together. For example, why is Osborne still here?"

That question startled me.

"After all," continued Tony, "Osborne opposes using the projector on what I believe are essentially moral grounds. But he's still here, isn't he? He's still involved in something he thinks is morally objectionable. Did Winthrop spell out how to keep him here, Carol?"

Carol, paler, started to respond, by her expression a denial. Tony cut her off.

"No. Winthrop just gave you the facts of life and let you figure out the rest. But why did he want Osborne here at all? That one bothered me the longest." He glanced at me. "Do you know?"

"I've wondered. I don't know."

"Your Mr. Winthrop was very careful to show me the projector had two applications, one coercive and totally unacceptable, the other persuasive—more or less—and, assuming the other factors in the situation were properly arranged, acceptable. He knew how I would react to the idea of letting him control the projector's use. So he made Osborne available to give me a third alternative—one he knew I had to—no, *have* to choose. Carol, I hate being manipulated, especially by you."

"No one's manipula—"

"What's the third alternative?" I asked.

Tony looked at me. "A limited use of the projector with someone in charge of that use who is more acceptable to me, someone more—what, trustworthy?—something like that."

"Me."

"Winthrop can handle the technical side, making the tapes and handling equipment problems, but you will be the one with the power to say, yes, use it, or, no, don't, subject to my approval. I know Winthrop's kind. He is a determined man. If I said no, could I be sure he wouldn't use it in spite of me? No. So without someone like you between him and his machine, I could never use it. He knows that. He picked you because of that. So the decision on whether the projector gets used isn't mine at all, Osborne, but yours. Do we use it?"

Tony was right. I remembered

the Winthrop saying objectivity would be a problem in Tony's campaign. I would need it. Somewhere, I had lost it. I should have seen the Winthrop's hand manipulating the situation, adjusting, refining. The Winthrop, involved all his life with the psychology of decision-making—it takes a decision to decide to buy a product—had balanced the external situation so Tony could make only one decision.

What about Roger Osborne? What decision would I make? Gradually, I realized all of us had been set up. The Winthrop wanted the projector used. His purpose had been clear from the beginning. Like the salesman he was, he attended to every detail of the transaction, producing the optimum conditions to make his sale, using me, using Carol, using Tony, compromising us all.

I looked from Tony to Carol. Intellectually, I understood what the Winthrop had done. Emotionally, I knew what I wanted. Emotionally, it didn't matter that I wanted it because of the Winthrop. Whatever I would lose by staying with the campaign, would be less than losing Carol, or not even Carol, but the hope of having her.

I nodded. "OK."

6

Lewis was just in here, looking over my shoulder. After two days of associating with him, listening to his asinine questions, I have taken a profound dislike to him. "I'm just doing my job, Osborne," he responds. He read over the last section of my statement and nodded, satisfied. "That's more like it. So Wentworth himself actually made the decision."

I snapped the pages out of his hand and told him to get out.

Lewis, I have no idea what kind of political game you are playing—what kind of reputation you want to make for yourself—but you are wrong to try and make it by using Tony.

I only have a little more to say. It ought to be enough, both for you and the rest of Governor Webster's crowd.

You know as much as I do about the primary election. One by one, the other Republicans dropped out, each giving his support to Tony. They knew Tony personally or from speeches in the legislature, a small group, ideal for feeling the impact of Tony's personality. Tony, by default, easily got the nomination—without using the projector.

After the primary, the situation changed. I found myself up to my ears managing a conventional advertising campaign for Tony. The Winthrop would have nothing to do with it. After all, he might inadvertently get Tony elected without using his projector.

I became caught up in the dilemma I predicted. If I tried to minimize Tony's poor media pres-

ence by staying with barnstorming politics, rallies, meetings, et cetera, an insufficient number of people heard him to be impressed. If I increased media coverage, the larger audience remained unimpressed. Initially, we had a favorable poll prediction. The Field Poll put Tony at 53 percent, explaining it on the basis of Webster's unpopular record and the electorate's ignorance of Tony. ("Ignorance," commented the Winthrop when I told him, hoping to deflate the confidence he had in our ultimate failure, "is the father of hope." I wondered, from time to time, whose ignorance he meant, the electorate's or mine.)

Over the summer, we slipped to 21 percent. To compound my problems, I turned thirty, noticed my first gray hairs and began suspecting I had an ulcer. The chuckwagon on the campaign trail is notorious.

My meetings with Carol, less frequent once the campaign got under way, became intense emotional scenes, beginning with the pleasure lovers take in seeing one another and ending in quarrels. Most of the quarrels were my fault. Short-tempered because of the campaign pressures and the hectic pace, I pushed her for a decision on leaving Tony. When Tony began slipping in the polls, she started accusing me of deliberately sabotaging the campaign, throwing everything in my face from my feelings for her to my Party affiliation. The emotional imbalance of the situation upset us all.

Except Tony. Throughout the campaign, he indicated—both by the things he said and his attitude toward me—an understanding of the problems I had to deal with. By the end of October, everyone knew we would lose.

On the Sunday before election day, the Winthrop called me at the hotel. I had just finished coordinating the advance men for Tony's last day of speeches, a rapid—almost frantic—last minute crisscross of the state from San Diego to Alpine County, culminating in a debate Monday night with Webster. I had not talked to the Winthrop for three weeks. Though my checks still arrived every week from the Winthrop building, signed in his meticulous hand, I had failed, among the myriad activities calling for my attention, to keep him abreast of events. He came on the phone talking.

"Osborne, do you ever get off the phone?"

"Rarely. Things have been frantic recently."

"And unsuccessful."

"I don't know if I'd—"

He held up a copy of Sunday morning's LA *Times*, cutting off my protest. The headline, in large red letters, read,

WENTWORTH CAMPAIGN
FLOUNDERS
AT ELEVENTH HOUR

"The *Times*," he said, "thinks otherwise."

"They've been wrong before."

"And so do I. Has Wentworth indicated when we are going to use the projector? The tapes are prepared. This . . ." He glanced at the paper, rereading the column under the headline: ". . . statewide debate you have scheduled for tomorrow evening—is it being holovised?"

"Yes."

"That seems to me like the ideal opportunity. We should have the largest audience."

He waited, expecting some response from me. I had none. Since my initial acceptance of my role as campaign advertising coordinator—as well as buffer between the Winthrop and his projector—Tony had never mentioned the projector, either to me or Carol. All of us assumed he planned some kind of last-ditch use of it.

"I really don't know what Tony has in mind, Mr. W, but—"

"Has he said anything recently?"

"No."

"Have *you* made any plans to use my projector?"

"No."

The Winthrop thought a moment, eyes looking past the camera, expression darkening. "He's said nothing."

"Not a word."

He looked at me, his chain of thought complete, determination evident on his face. "Wentworth is somewhat tougher than I had thought. Give him this message, Osborne. Tell him I have completed the tape. Tell him I intend to make arrangements within the next twenty-four hours to use it. Tell him—"

"Mr. W, *I'm* supposed to have the authority to—"

"Forget that nonsense, Osborne. Just deliver my message. The situation has, I think, changed and I don't have time to worry about some illusory agreement. Tell him I intend to use the projector whether he consents or not. I will not have some two-bit politician interfering with my plans. Do you understand that, Osborne?"

"No, *I* don't understand it and I don't think Tony will understand it. I don't understand *you* either. I think you're sick or something."

"Are you finished?"

"Completely."

"Fine. Now be a good boy and deliver my message."

He hung up.

I tried to contact Tony. When I finally got through to him in Sacramento, he listened, stoic, to my delivery of the Winthrop's message. I expected a reaction, violent, explosive. None came. When I finished, Tony said, "Thank you, Osborne. I want you to wind up the campaign. Call Webster's people. Tell them the debate's off for tomorrow night."

"It doesn't matter. He'll just buy air time."

"I know that. Please do as I say. I want you to know I appreciate what you've done over the last few months. You've been trying to solve an impossible problem. Winthrop, frankly, is right. The only way I can become Governor is by using his projector. He's an intelligent man. I wish he were more than intelligent."

He started to hang up, then hesitated, a reluctant, pained expression on his face. "By the way, I believe Carol is at our house in San Francisco. You might tell her about this conversation. I plan to come back to the city tomorrow. I'll stay on the boat. That should avoid any embarrassment."

After he hung up, I sat in my hotel room mulling over the conversation. The longer I thought, the more ambiguous it became. At first, I thought Tony was agreeing to let Mr. Winthrop use the projector, realizing it would be used no matter what he said. But something in his tone, a resigned, matter-of-fact flavor, had caught my attention. It seemed inappropriate to my interpretation. I tried to call him back. The line was busy.

I saw Tony only once after that, the following Tuesday. No one, including Carol, had seen him since Sunday. The news about the projector broke Monday morning, headlines from San Francisco to Washington. The papers, picking up my news releases, kept saying Tony was "in seclusion" or "unavailable for comment." The detail carried in the stories—what the projector did, its developer (someone had found a twenty-year-old picture of the Winthrop; after that, the press kept saying "the young developer of the telethesia projector"), its planned use in Tony's campaign—indicated someone had been available for comment.

Tuesday night, I parked Carol's station wagon in the lot near the marina. The polls had closed a half-hour before. When I got to the boat, I paused at the gangplank and looked out at the bay. The day, windy, had blown the fog out to sea. Through the clear night air, I could see the lights of Sausalito on the Marin County side. The Golden Gate Bridge, itself lit and busy with streams of cars, showed clearly from the deck.

Tony, barely visible in his dark coat, its collar up, sat on deck watching the bay. Aware of my presence, he spoke without looking around.

"Why did you come, Osborne?"

"I thought I owed it to you."

I sat down in the canvas chair next to him, remembering my last visit to the *Carol.* Gradually, I became aware of murmuring voices from somewhere. I looked around. Light showed around the edges of the main cabin hatch. Below, either a radio or a holovision was reporting election returns.

". . . *Proposition twenty-seven, the controversial tax reform initia-*

tive—first proposed, I believe, by Tony Wentworth—seems to be going down in . . ."

"You don't owe me anything, Osborne. You did your job. And Carol can make her own choices. Has she made it, by the way?"

"Yes. She's waiting for me at the hotel." I let him absorb the information. "I felt I owed it to myself, then, if not to you. I thought you were going to let Winthrop use the projector."

He remained silent. The voices from the main cabin were relaying computer extrapolations of early election returns: ". . . *as expected after yesterday's revelations, Tony Wentworth is trailing significantly. With two percent of the vote counted, our computer projects a landslide re-election for . . .*"

"I think when things settle down," said Tony, "I'll take a trip. Acapulco. Someplace warm."

"Tony, there was someone named Lewis from the state Attorney General's office at my hotel today. He wants me to make a statement. What shall I tell him?"

"Just tell him the truth, Osborne."

I left the boat a few minutes later. That was the night before last. Since then, I've been writing this damn statement, trying to show you the truth, Lewis. For your own reasons—political reasons—you want Tony to be guilty of something. You want me to say he ordered the projector used and someone (Who would you like it to be? Me? Carol? The Winthrop?) called Dunnigun and leaked the story, then made the anonymous call to your office.

Me? No, not me. I should have. I wanted to. I didn't have the guts to pick up the phone, to lose everything. Tony did. ■

THE ANALYTICAL LABORATORY

The AnLab is your chance to tell us which stories you like best, and thereby reward your favorite authors with solid cash. It works this way: send us a card or letter with a list of the stories in each month's issue, ranked in the order in which you preferred them. We average the votes and publish the results here. The story that comes closest to having an average of 1.00 (which would mean it received a first-place vote from everyone voting) earns its author an extra one cent a word: $100, in the case of a 10,000-word novelette. The story in second place receives a half-cent extra per word.

February 1976

Place	Title	Author	Points
1	Children of Dune (Part 2)	*Frank Herbert*	2.023
2	A Matter of Pride	*Kevin O'Donnell, Jr.*	2.380
3	The Winnowing	*Isaac Asimov*	2.928
4	A Martian Ricorso	*Greg Bear*	3.069
5	The Better Mousetrap	*Hayford Peirce*	4.428

the reference library *Lester del Rey*

FROM THE BEGINNING

1976 is, of course, the bicentenary year for the United States, and everyone must have heard of it by now. So far as I know, there is hardly a maker of anything from penny candy to billion-dollar appropriations who hasn't stuck his finger in the pie. Oh, well, I suppose our noble forefathers were probably as venal and meretricious as we are—they just lacked our experience.

However, there is another important anniversary for those who are more or less devoted to science fiction. 1976 is the semicentenary of the existence of science fiction magazines, the first of which appeared with the April, 1926 issue of *Amazing Stories,* now busily producing a special issue to celebrate fifty years under one title.

Whether anyone is actively seeking to make a deliberate bit of profit out of that, I'm not sure. But there must be some awareness, since it's remarkable how many books are looking back at our early days, either as historical sources or as ways to bring out another anthology.

Fifty years of existence of any type of magazine is something well worthy of pride and a feeling of accomplishment. This is especially true for any specialized fiction magazine. Indeed, I can think of none outside our field that lasted so long. Fifty years ago, there were hordes of magazines that specialized in one type of fiction, published by a number of large chains.

Today, almost all have gone. In 1957, American News Company—the biggest distributor of magazines, controlling the best outlets—folded abruptly. This curtailment of the market killed most of the magazines, and the rest began to disappear shortly thereafter. There are no sports fiction magazines today, and detective and western pulps are rare and not the same ones that had lasted on the stands for decades before the collapse. Of all the categories, science fiction alone proved viable enough to endure in noticeable numbers.

I sometimes wonder what those who preach that science fiction was hampered by being in a ghetto make of that. Certainly the western fiction was in as much of a ghetto as science fiction; yet I have seen no sudden spurt in quality when the walls of the ghetto were torn away.

(Of course, there never was a science fiction ghetto; that is just a

beloved myth of those who want to be our saviors by freeing us from the bogeyman—thereby gaining much repute. There was never a time when a writer with the desire and skill enough couldn't emerge from the science fiction pulps into any other part of literature; nor was there ever a time when science fiction didn't appear elsewhere. All that happened was that there was a group of magazines into which the writers could turn their stories, unhampered by the need to fit themselves into the secular demands of the mainstream, a place where they could develop their own type of literature freely.)

Anyhow, it seems our beginnings have been rediscovered and are now being chosen as worthy of note.

In fact, judging by one book, it seems that our history is worthy of rather an elaborate and expensive note. The publishing firm of Prentice-Hall has just issued **Alternate Worlds: The Illustrated History of Science Fiction,** by James Gunn ($29.95, 256 pp.). This is a large book, 9 x 12 inches, and is copiously illustrated with reproductions of magazine covers and interiors, many in color, plus a great many photographs of writers, editors, artists and fans. Naturally, it has the inevitable introduction in which Isaac Asimov tells us some of the epic of his love affair with science fiction! It also has an appendix of Hugo and Nebula awards, story themes, a chronology and an index. It's an eye-catching book of the type meant to lie upon a coffee table and be displayed.

In general, it's a handsome book. Still, I'd have been a little happier if Prentice-Hall had displayed as much confidence in the field as the price of the book would indicate. The dust jacket art is adequate—red disc in back, silhouetted rocket, and foreground landscape that looks like badly crumpled tinfoil; but I suspect a number of our science fiction artists could have done better.

The history written by Gunn runs to about 100,000 words, which makes it much more of a book to be read than most coffee table volumes—much to the credit of the book. I have little to quibble about in that copy. The one feature which I personally question is the fact that almost half of that is devoted to the history before 1926—and fascinating as the early history may be, I feel that the real development of the literature came in the magazines and later books. This may be only a personal bias. The early history is well done, without needless insistence of trying to advocate any single origin of the literature.

(I must confess here that I'm not as disinterested in the business of how our history should be written as I should be; I'm currently writing such a history, originally contracted for more than six years ago. I suppose that must color my judgment somewhat.)

The later history also strikes me as being generally fair and well-balanced. Gunn does not inflict personal opinions on the reader, but covers the stories in the magazines in a way which I feel touches

on all the important ones and puts the evolution of the field in good perspective.

I wish the publishers had done as well. Many of the color plates are not as accurate in their reproduction as they should be. The black-and-whites are better, but several photographs are mislabeled. On one page, as an example, there are two photographs of Robert Silverberg—but one is identified as Thomas N. Scortia. Knowing James Gunn and his familiarity with both men, I am sure the fault is not his. Also, I'd have liked to see a little more attention on the part of the men responsible for the layout to getting the illustrations to follow the text more closely.

However, mostly on the basis of the text by Gunn, I consider this the best history of science fiction yet to be published. If you can stand the price, by all means buy it.

In England, Michael Ashley is also preparing a set of books designed to show our half-century of development. This will be in a set of five books, each representing one decade, consisting of a long, historical section, followed by a story from each year. His **The History of the Science Fiction Magazine, Part 1, 1926-1935** (New English Library, £2.95—about $6.00, 239 pp.) seems to give a fairly representative example of some of the better stories of the period, but omits what I would consider the very best stories. Perhaps this is deliberate, since so many of those stories have been anthologized repeatedly. But I find it strange to see 1934 without the trio of stories which did more to turn science fiction from gadget-action stories into ones that could be read by those less obsessed with overt wonders: "Twilight" by Don A. Stuart, "A Martian Odyssey" by Stanley G. Weinbaum and "Old Faithful" by Raymond Z. Gallun. Surely one of them should be there, and the Gallun has not been reprinted that much. (There is a Gallun story for 1935, and an excellent one.)

Still, the stories are mostly still readable—which cannot be said for a large percentage of the earliest ones from our history. The book represents the period quite well as to the feeling of the stories, and the historical section is lucid and informative. There is an appendix which gives the works of each author for the period, with Edmond Hamilton shown to have written an incredible 78 stories in that decade! (Pen-names are also listed.) Then we find that David H. Keller wrote ten more than Hamilton in the same decade! There is also a listing of the issues of all the magazines for each year and another list showing all the editors and the periods for which they served.

Part 2, 1936-1945 is a longer book, 298 pages at £3.95—about $8.00. Much the same character as in the first is exhibited. Here there is an obvious intent to take stories from a representative list of magazines, rather than to let Astounding authors dominate. I find it strange, however, to consider this period with no Heinlein, Asimov, van Vogt, Sturgeon, etc. The fiction

seems representative of the magazines—if there had been no Astounding to dominate and shape the whole history of the decade.

Probably these books will be available at some of the specialty science fiction book stores or by order from the dealers who issue catalogs for mail orders. I hope some soft-cover publisher here will pick them up. While I have reservations about them, they are generally well worth reading and they tell a good deal, by example, about our development.

Damon Knight is also looking back toward our beginnings in his latest anthology, **Science Fiction of the 30's** (Bobbs-Merrill, $12.50, 468 pp.). Again, some of the greatest stories are missing—there is no Stuart, for instance. But most of the stories are very good and there are eighteen of them. (I refuse to take up half a column by listing stories and authors. If you're interested, you can quickly determine the contents from the table of contents. I also refuse to list chapter titles on novels, so it's all fair!)

There's one curious entry which I'm glad to see. This is "The Battery of Hate" by John W. Campbell, Jr. Those who think they know all about Campbell from reading his editorials are going to be surprised at some things in this. It is the view of what many of the young radicals of the day were thinking. It deals with the invention of a fuel battery (Campbell actually did develop a primitive one for himself) which threatens to put big business out of existence. And most of the plot deals with the evils of those big businessmen! It's not a great story, and there are no supermen or space wars here; but it's a noteworthy facet of Campbell's development.

Perhaps the most interesting thing in the book, however, is Knight's foreword. He begins by citing an article he wrote a few years ago in which he said that there was no audience for the old stories and that they were all junk. That article has been the basis for numerous lectures and articles by many writers and teachers, and has influenced an enormous number of assured diatribes by people who never read those magazines extensively—as Damon definitely did when he was young.

But now he says simply: "That (article) was sour grapes . . . many of the forgotten stories of the Thirties are forgotten gems." Good for you, Damon, and welcome back!

Most of the stories in the anthology really have been neglected. Few have been reprinted at all extensively. It makes for a lot of good reading and I'm glad to add it to my shelf.

Doubleday continues to issue the one-author personal surveys of the early years. The latest is **The Early Long,** by Frank Belknap Long ($7.95, 211 pp.). This slim volume is obviously overpriced. For that much money, they should have given Long enough room to say more than a few words here and there. There are 17 stories, most of them quite short—but there simply

isn't room for the author to tell much about himself. And the charm of this series never lay in resurrecting the older stories that had not usually been collected by the author. It lay in the insight it gave us into the origin of the stories in the writer's life and attitudes.

There is not much of that here. We don't learn a great deal about Long. And while Long was closely bound to many of the *Weird Tales* writers and knew Lovecraft as well as anyone, I found only mention of it here.

A pity. But the book simply isn't worth bothering with at the price.

Now to get back to the present.

When Tanith Lee's **The Birthgrave** was issued by DAW Books, I was delighted with it—and still am. (If you haven't purchased it, I recommend you do so.) I thought we were witnessing the beginning of a remarkable new talent, and there is always a need for that.

Now I have her *Don't Bite the Sun* (DAW Books, $1.25, 158 pp.). Well, the writing, for the type of story, is still that of a highly skilled professional. And her grasp of characters—for the type of characters she chooses to use—is also sure. She doesn't pay as much attention to the world in which those characters exist; this story mostly takes place in a narrow compass. But what little she shows us of the world is at least fascinating, though it leaves us with far more questions than answers.

But, unfortunately, it strikes me as a book that wasn't worth writing, a character that should have been strangled by page 10, a world that simply doesn't matter to the story, and a style admirably suited to the character and the story—and hence, necessarily silly.

There are a number of assumptions behind the novel (if, indeed, it be a novel). Perhaps the first is that the humans live on a world and at an advanced technological state where they are really useless. The second is that since they grow up without any visible purpose, the young must be indulged and even encouraged to act as if there were absolutely no restraints on them. No, I take that back; there are restraints against their doing anything even remotely adult or sensible.

And there's an implicit assumption which is carried out in the book. This is that in such a mixed-up piece of juvenile decadence, nothing in the world can matter, and there can't be a story or a plot, so what does the novel itself matter?

There's a lot of invented slang. Actually, while there's a certain silliness to it, it's appropriate; such a society of delayed juvenility would have such a slang. And to Lee's credit, after the reader finally accepts it, it works well enough to avoid making things hard to follow. (Oh, forgot to say that these juveniles are apparently practically immortal, so the "heroine" may be hundreds of years old, for all we know. If anyone kills himself, they somehow simply patch him together by some miracle—in any type of body, male or female, he chooses—and let him go out to kill

himself again. There's no chance to learn anything by any experience.)

From there on, the novel runs downhill! Our gal wanders around, protests, gets bored, decides to grow up and is discouraged, tries a few marriages, goes outside where she finds stuff in an old digging that might have developed into something, and then lets nothing develop. In the end, we're back where we started—unless we've fallen asleep, as any sensible reader would have done.

A damned shame. She's still a potentially fine writer, but she's wasting her time on this. How do you say unrecommended?

Finally, a pleasant note. For those who are not SF Book Club members and aren't going to get the Dorsai Trilogy published by them, it's still possible to get the uncut version of **Dorsai!,** by Gordon R. Dickson (DAW Books, $1.50, 236 pp.).

This was the novel that really established Dickson as a major writer, and it's a classic by this time. But in the Ace edition, it was cut to make it fit into one of their Doubles, initially under the title of *The Genetic General.*

It's too good a novel to deserve that treatment, and I'm delighted that DAW Books has restored it to its proper form and issued it where it's easily available. If you have never read it, or have it only in the cut version, this should be a must book. ■

in times to come

What happens after the end of the world? Stanley Schmidt's 1973 serial, "Sins of the Fathers," ended with the Earth being rocketed out of the Milky Way to escape a galactic core explosion. Next month's lead novelette takes up Schmidt's story where he left off, and shows how life on Earth—and our solid planet itself—are totally changed by this desperate flight to safety. Jack Gaughan's knockout cover shows one of the first catastrophic effects of the flight: the city of Melbourne is flooded by the huge "gravitational" tides of the Pacific.

The science fact article for June is "Detesters, Phasers and Dean Drives," an up-to-date report on the Dean Space Drive and similar unorthodox propulsion devices, by G. Harry Stine. It's been more than fifteen years since the late Norman L. Dean demonstrated his first device. We don't have a Space Drive yet, and Stine's piece will show why . . . and when.

Next month we will also have a short story by Christopher Anvil, the second installment of "Minotaur in a Mushroom Maze," and all our regular features.

Dear Ben:

Your Editorial, "The SF Game," in the October issue covered the matter of "prediction" in science fiction quite well. I would like to add this, however: Your statement ". . . there are more accurate and usable forecasts of the future in SF than in any other body of literature . . ." applies to all of the *pseudo*-scientific methods of prediction currently in vogue (astrology, numerology, et cetera) as well.

There is another matter I would like to discuss here—something that I hope you and your readers will have ideas on.

Most people have, at one time or another, come up with a really good idea for improving existing technology, solving social problems, using resources more efficiently, or whatever. If the person is excited by the idea, he (or she) might put a design on paper, discuss it with others, and gain a good evaluation of its potential.

In most cases, the idea dies at this point. Whether he's working on a solar energy conversion device or a better ink pen, the person doesn't get much beyond the design stage before he discovers that he doesn't have the resources to implement his idea—and gives up.

I am speaking of individuals, of course. Engineers, designers, *et al.*, working for universities, foundations, corporations, and government agencies *have* the time, material, and financial backing necessary to make studies, build prototypes, and debug to their hearts' content. But the average person usually cannot spare the time or obtain materials necessary for developing his concept. And if the idea involves changing an existing system, he doesn't have the reputation and/or connections that are needed to get people to listen.

In addition to this, our patent and legal system is such that it discourages most would-be innovators—or allows them to be ripped off before they can realize the fruits of their labor.

The result of all this is that there is an incredible amount of creativity, knowledge, and ability being *wasted.* There are useful ideas and solutions to problems available which are needed now. Chances are that they'll never see the light of day—you don't build fusion devices in your basement, and you can't afford to fool around with expensive electronic equipment on an income of eight or ten thousand a

year.

I think you'll agree a problem exists—but what is the solution?

Many large corporations offer financial rewards to employees who come up with ideas to improve their products or save money. These corporations (and some government agencies) could find it profitable to set up public "suggestion programs." Such programs would require a lot of good faith and honesty on both sides of the fence (and perhaps some protective legislation), but I believe they would prove practical.

If the innovator needs to build a prototype of a device, however, government or foundation backing seems to be the only answer—unless some sort of innovators' union could be set up, in which case resources *and* knowledge could be pooled.

There are, no doubt, other ways to make it easier for an individual to improve things, and perhaps profit by it personally, and I hope something can be worked out. There is just too much brainpower going to waste.

MICHAEL A. BANKS
PO Box 312
Milford, Ohio 45150

New ideas—and their effects on people—can also be explored in science fiction stories.

Dear Ben:

. . . Every boy and his dog seems to have fallen in love with this private word, *ghetto.* They talk of black ghettos, Puerto Rican ghettos, Spanish-American ghettos, ghettoization.

I'm told there were walls around real ghettos. You didn't leave because it was illegal to do so. And every so often the goyim would flood in to burn you out . . .

But I was raised Episcopalian, with a touch of Irish-American and no real emphasis on the religious aspect. I am now an agnostic. The phrase "science fiction ghetto" goes right past my ear, raising no echoes from my personal history. Armed with my mainly theoretical knowledge of ghettos, and a strong streak of empathy, I listen as various knowledgeable members of the Science Fiction Writers of America tell of the science fiction ghetto. And I learn that:

1. A good writer can't get himself taken seriously if he has become known as a science fiction writer. This restricts sales of even his mainstream books. It's expensive to be a science fiction writer.

2. Writers of the stature of Kurt Vonnegut, Jr., and John D. MacDonald have learned their trade writing science fiction, then become wealthy by migrating to the mainstream. Lately Barry Malzberg and Harlan Ellison have chosen to see to it that the "science fiction" labels, covers and blurbs will be removed from their books.

3. We who choose to remain "science fiction writers" do so for at least four reasons: the security (because a book with the SF label will sell a certain minimum of copies, no matter what); the company (of our own kind, which includes some fine original thinkers, among readers as well as writers);

the recreation (fan conventions and fringefan gatherings like the SCA); and the ego-stroking (at fan conventions and through fan mail).

4. We are, if not hostile to, at least picky about outsiders. Writers who wouldn't use sloppy research in their mainstream novels think they can get away with it in science fiction. Quite the opposite is true. Getting ultraviolet and infrared mixed up in a science fiction story is fatal, and SF reviewers are merciless toward such mistakes. A reputable mainstream writer must still prove his talents and demonstrate something of an adequate education, before we'll let him in. Naturally this contributes to the separation between science fiction and mainstream—the "ghettoization."

OK. I don't know from ghettos. But I know what kind of a place it is that won't let outsiders in unless they meet certain standards; that is expensive to stay in; that a member can get out of any time he pleases; that people join for the company of their peers, the recreation, the ego-stroking, and the security; that places a barrier between its members and the outside world.

Ghetto? That's the Los Angeles Country Club!

Well, almost. When a member must resign from the Los Angeles Country Club, for financial or other reasons, he does so quietly. It is hardly something to brag about. He tries to keep up the contacts, and he gets back to the Club as often as possible, if only as someone's guest. Such does not seem to be the case when a science fiction writer goes to the mainstream for its better pay and more lenient standards. Ah, well. No analogy is perfect.

LARRY NIVEN

Science fiction has been a publishing ghetto for half a century, as anyone who's tried to sell SF to the general public can testify. But a succession of shocks, starting with Hiroshima and culminating with Apollo 11, has apparently convinced even the most skeptical average citizen that science fiction can "predict" the future. Whether SF writers try to encourage that skewed notion and sell their wares to the masses, or continue to speak the True Faith to the dedicated fans of science fiction, is a decision each writer makes individually. And he or she makes it with every story sent to market.

Dear Mr. Bova:

I recall the latter Sixties with mixed feelings.

The New Wavers were winning Hugos and Nebulas all over the place, to my distaste; but Pohl and Campbell were still running their magazines in the Old Wave tradition, to my joy.

Most distinctly, I remember my loath for the man who led this New Wave, Roger Zelazny. Though his stories were sometimes included in magazines of otherwise Old Wave material, I felt he didn't deserve to be called a true writer. To me, his prose lacked coherence, one passage jumping completely out of context from the preceding one; his characters were flat, without life, names only, like cardboard cut-outs; his stories wandered from beginning to end without any plot

for a guide. I considered his works a disgrace to science fiction.

However, I was delighted to read "Home Is the Hangman" in your November 1975 issue. Zelazny has changed his way of writing.

As Poul Anderson went from Old Wave to New Wave with "Goat Song," Zelazny has gone from New Wave to Old Wave with "Hangman" . . .

I hope to see more of his work.

Also, I approve of the Di Fate cover and interior illustrations. I think it's a good idea to have several artists draw for Analog. In that way assignments can be alternated between them. That prevents them from becoming overworked, and so allows them to concentrate on quality . . .

LEE SMITH

410 Claremore
Ft. Lauderdale, Florida 33401

The New Wave–Old Wave controversy evaporated some time ago when writers on both sides started taking the best features of each to make their stories stronger and better. Which is the way most "artistic" quarrels end: in synthesis.

Dear Mr. Bova:

"To Live in Alloy Continuity" (November 1975 issue) is a fine example of what happens when SF discards the sterile gadgetry of the past and focuses on the eternal truths of the human condition. The decision, whether to kill a horribly injured friend, was one that could be faced by a soldier in any war. The SF trappings were just grafted on. The only SF detail that mattered–maimed men of that future time lived better than maimed men of the present–turned out not to affect the decision.

We all know a blood-and-thunder story, where the good guys are only incidentally Space Patrol rather than Marshals, the bad guys only incidentally BEMs rather than cattle rustlers, is bad SF. We are told, and generally believe, that if science fiction isn't essential to the story, it is bad SF. We sneer at transplanted Westerns.

Apparently, when the transplanted story involves not physical action but pain or madness, we have Art, to be judged by different standards.

To write this letter, I searched through my old Analogs for two more examples of the same sort of thing. I was surprised at how long

ago two stories I remembered vividly were published. Before you get the wrong idea, let me remind you that mediocre stories are soon forgotten; the very bad are remembered along with the very good.

"The Second Kind of Loneliness" (December 1972) was about the solitary lighthouse keeper who goes mad. It is characteristic of this kind of story that I had to think a minute to remember the excuse for putting a lighthouse out past Pluto's orbit. It is also characteristic that the SF background, being just an excuse for Art, doesn't quite make sense. Why just one man for such a vital job? What if he goes mad? What if he trips and hits his head, swallows the wrong way and chokes, or whatever? Ah well, it was an excuse for a nice cover.

Then there was "Common Denominator" (October 1972) about the World War One fighter pilots (on opposite sides) who wave to each other during the battle, and exchange some mutual respect. This was by far the worst of the three, since the SF background was not merely unnecessary but spectacularly nonsensical. It took a lot of doing to get that Sopwith Camel into orbit. Detailing all the mistakes made in the process would require an essay longer than this whole letter, tedious to write and tedious to read.

I suppose we must expect more of this kind of thing as science fiction matures, shakes off its pulp origins, and becomes a critically respected Art form. Life is change. We engineers have had our day with Analog, the literary critics are about to have theirs.

I consider this a fine example of the difference between motion and progress.

RICHARD BRANDSHAFT
4315 Inglewood Blvd., Apt. 5
Los Angeles, California 90066

Words like Art *(with a capital A, yet!) are bound to start arguments. The science-fictional aspects of "To Live in Alloy Continuity" included both the "gadgetry" and the basic social question of how we handle euthanasia. While Analog's audience was reading that story, the newspapers were filled with questions about Karen Ann Quinlan, who was being kept alive by modern medical gadgetry despite the wishes of her parents. Science fiction has always dealt with the social and human implications of new technology. Behind the gadgetry there are the people whom the gadgetry affects. Whether or not it's "Art" is up to the readers and critics to determine. We just publish stories that show the interaction between science-and-technology and human character. That's what "The Second Kind of Loneliness" and "Common Denominator" were about, too.*

Dear Mr. Bova:

Your Editorial, "The Broken Promise" (December 1975), contained several errors:

1. You concluded that governments collapse because of large bureaucracies rather than from "internal decay, moral turpitude, foreign invasion . . ." You cited the Roman Empire and Nazi Germany as examples. The reasons for the fall of the Roman Empire are many

and are still debated, but surely you know that Nazi Germany collapsed because of foreign invasion.

2. You implied that a more efficient way to separate U-235 from natural uranium would eliminate the need for breeder reactors. Breeders are needed because there isn't enough uranium to supply the U-235; separation efficiency has no bearing on the problem.

3. Your expression, "playing Russian roulette with extremely dangerous plutonium" ignores the fact that for the past thirty years many of the world's nuclear reactors were for the primary purpose of producing plutonium (for weapons). The handling problems have long since been solved.

4. You imply that we, meaning the USA, control the future of the breeder reactor. A number of countries have strong reactor programs and we are behind in breeder technology. All our slowdown will do is to ensure that we will buy the reactors instead of sell them.

Public resistance to nuclear power has been caused by people and organizations who have not hesitated to lie and dramatize. The nuclear research community is handicapped in dealing with the public for two reasons. First, we can't state that ANYTHING is one hundred percent sure or safe, and the public can't understand why. Second, we are not allowed emotional arguments. Why the hell not?

R. M. CARROLL
169 Northwestern Avenue
Oak Ridge, Tennessee 37830

1. Nazi Germany fell because of an invasion it failed to repel. *One reason the Allies weren't thrown back from their Normandy beachhead was that no one could release the Panzer reserve divisions except Der Fuhrer himself, who was asleep when the invasion hit, and was not awakened by his lackeys until it was too late. If that's not the epitome of red tape, what is?*

2. Cheaper enriched uranium will make conventional nuclear power plants more attractive, economically. It's the cost of nuclear fuel, not its availability, that is a major hampering force in the development of fission power. There is enough uranium available for more than a century of intensive use. If we haven't developed cleaner and more efficient

energy sources in that time, we will face a real *crisis.*

3. The amount of plutonium produced for weaponry is a small fraction of the amount that the former AEC predicted would be necessary to power a full-scale breeder-based energy system.

4. I doubt that anybody will sell breeder reactors to anyone. Fusion is coming too fast, and the breeder is in much the same boat as the steam-powered airplane—possible, but hardly desirable.

Finally, I'm afraid the AEC and the proponents of uncritical acceptance of nuclear power have been just as dishonest as the wildest-eyed econuts. Smugly insisting that everything's fine when it isn't is just as bad as crying wolf. Maybe worse.

Dear Ben:

May I offer a mild defense of NERVA? Kingsbury's excellent article on atomic rockets reflects his defense of Dumbo, and I shan't go into the factors that produced some of the engineering decisions that resulted in Dumbo's cancelation; but to describe NERVA as "an underpowered motor that left no alternative but cancelation" seems unduly harsh.

Yes. The original concept was to build an Earth-to-orbit nuclear rocket; the deep space mission for NERVA came much later. But the final development of NERVA was done with full knowledge that no atomic rocket was ever going to take off from Earth's surface. We had signed the Treaty of Moscow; and "nuclear pollution" was just too big a political issue to fight. Never mind that for the price of a little fall-out we might have, through a Dumbo concept, access to the space environment where we could spark off the Third Industrial Revolution . . .

But as a deep-space motor, NERVA was a howling success. It was a success to the day that the project was canceled. So it won't lift itself off the Earth. Neither will most second-stage chemical engines, and so what? Maybe we ought to be working on Dumbo, but NERVA is right now a conservative-designed *reliable* vehicle that would get us from Earth orbit to almost anywhere in the Solar System; would power a Mars-Venus-Asteroid research vessel with a crew of a dozen and a fully-equipped astronomical and planetological lab; and the people who worked on NERVA have a right to be proud of themselves. It's not their fault that Congress decided to turn NERVA into salaries for welfare administrators.

JERRY POURNELLE

But the major cost of space operations is in boosting payloads from Earth's surface into orbit. That's where new ideas are needed most.

Dear Ben Bova:

In your December 1975 issue there was a piece which was absolutely great and I wonder if there is a way to get a larger copy of it. It was "Unified Field Theory" by Tim Joseph . . .

SERINA ROSENTJA

How about it, readers? Who else wants reprints of "Unified Field Theory"?

analog

A Calendar of Upcoming Events

May 3-6, 1976:
Offshore Technology Conference at the Astrohall, Houston, Texas. Info: IEEE Meetings Inquiries, 345 East 47th Street, New York, New York 10017.

May 5-7, 1976:
Carnahan Conference on Crime Countermeasures at the University of Kentucky, Lexington, Kentucky. Info: Meetings Inquiries, IEEE, 345 East 47th Street, New York, New York 10017.

May 11-14, 1976:
ELECTRO 76, the Eastern Seaboard Conference (NEREM/Introcon) Meeting of the IEEE. Info: IEEE, 345 East 47th Street, New York, New York 10017.

May 25-27, 1976:
First Conference on Laser and Electrooptical Systems at San Diego, California. Info: L.E. Hill, PR Chairman CLEOS Conference, Hughes Aircraft Company, 3100 West Lomita Boulevard, Torrance, California 90509.

May 28-31, 1976:
AUTOCLAVE (Detroit area SF Conference) at the HoJo New Center Motor Lodge, Detroit, Michigan. Guests of Honor: Gene Wolfe and Donn Brazier. Toastmaster: Mike Glicksohn. Registration: $5 until April 30, $6 from May 1; $7 at the door. Info: Box 04097, Detroit, Michigan 48204.

May 28-31, 1976:
DISCLAVE (Washington, DC area SF Conference) at the Sheraton-Park, Washington, DC. Guest of Honor: William Tenn. Registration: $3 until May 21; $5 thereafter. Info: Alexis Gilliland, 4030 Eighth Street South, Arlington, Virginia 22204.

September 2-6, 1976:
MIDAMERICON (34th World Science Fiction Convention) at Hotel Muehlbach, Kansas City, Missouri. Guest of Honor:—Robert A. Heinlein; Fan Guest of Honor: George Barr; Toastmaster: Bob Tucker.

—ANTHONY R. LEWIS

LIVE IN THE WORLD OF TOMORROW...TODAY!

A BETTER LIFE STARTS HERE

(And our FREE CATALOG is packed with exciting and unusual values in hobby, electronic and science items—plus 4500 finds for fun, study or profit . . . for every member of the family.)

SUPER 6"

SPACE CONQUEROR

Superb Astronomical Reflector—Up to 576X. Capable of revealing faint stars of nearly 13th magnitude, split double stars separated by less than 1 sec. of arc. Features 48" F.L. aluminized & overcoated 6" f/8 ground and polished parabolic mirror (Pyrex®) accurate to ¼ wave, 6X achromatic finder scope, 3 eyepieces—wide field 48X Kellner, ¼" 192X Ramsden, & a Barlow to double & triple power—rack & pinion focusing mount. 47¾" aluminum tube. Electric clock drive w/manual slow-motion control. Setting circles. Heavy-duty equatorial mount. Pedestal base. Compares to $350–$400 models.

No. 85,086...(Shp. Wt. 68 lbs.).....$285.00 F.O.B.

6" WITHOUT CLOCK DRIVE...No.85,187A...$249.50 FOB

4¼" REFLECTOR (45X to 135X)

No.85,105A.....$159.50 FOB

4¼" WITH CLOCK DRIVE...No.85,107A.....$199.50 FOB

3" REFLECTOR (30X to 90X)...No.85,240A.....$ 59.95 Ppd.

KNOW YOUR ALPHA FROM THETA!

For greater relaxation, concentration, monitor your Alpha/Theta brainwaves w/ audible or visible signal on Biosone II. Has 3 feedback modes, outputs to monitor logic signal, filter sel. feedback, broad sensitivity control; other professional feats, of $200-up units. Easily operated 4-lb. portable has total brainwave monitoring capability! Req. 2 9v tr. batteries.

No. 1668A (9½x5¾x4¼").....$149.95 Ppd.

LOW COST STARTERS' UNIT (PORTABLE)

No. 71,809A (4½x2¾x1¼").....$55.00 Ppd.

ELEC. DIG. STOPWATCH: $49.95

The **price alone** obsoletes your wind-up timer and it's ±0.002% accurate! Hand-held, you start, stop, reset compact 6-ouncer w/one hand; times to 59 mins, 59.9 secs in 1/10 increments. Failsafe design (cannot be accidentally reset), solid-state electronics! Incls neckstrap, repl. batts.

No. 1671A (5-DIGIT LED DISPLAY).....$49.95 Ppd.

SPLIT ACTION W/NICADS, RECHARGER

No. 1669A (5-DIGIT LED DISPLAY).....$79.95 Ppd.

DELUXE SPLIT ACTION BATTERY MODEL

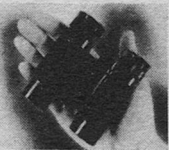
No. 1653A (6-DIGIT NEON DISPLAY).....$149.95 Ppd.

WORLD'S SMALLEST CALCULATOR!

Small but mighty! 8-digit, 4-function **electronic** calculator does everything big ones do—even has automatic % key . . . **for only $19.95.** Take it anywhere. Fits in your pocket—⅓ size of cigarette pack, 3½ oz. dynamo features floating decimal, constant key, lead zero depression, more! Includes plug-in rechargeable Ni-Cad battery pack. 2 x 3½ x 9/16" with plenty of room for most fingers. Another Edmund first with advanced technology.

Stock No. 1945A.....$19.95 Ppd.

SAVE 50%! 8 X 20 BINOCULAR



Special purchase saves you more than $50! Fully coated 8 X 20 pocket-size binocular with 360 ft. field of view, great for stadium, theater, track, vacation. Instead of $99.95, **you pay just $45.00 while supply lasts.** Even if you own regular size binoculars you'll want this lightweight (10 oz.) rugged mini-model to take everywhere. Get full-size performance from a binocular that fits in your palm, makes a fine gift. Low price incls. leatherette zipper case.

Stock No. 1567A.....$45.00 Ppd.

LEARN HOW TO RELAX BETTER!

New inexpensive biofeedback monitoring device helps you learn tension reduction techniques w/o electrode headbands, messy creams. Designed by clinical psychologists working in the stress reduction field, this handsome Executive Galvanic Skin Response Meter features solid-state electronics for great sensitivity, compactness, dependability. Walnut & gold-plated brass case. Uses 9v batt. (incl). Learn to take a 10-minute "vacation" at your desk!

No. 42,393A...(2½ x 4 x 1¾").....$55.00 Ppd.

SOLAR POWERED WATCH: $199.95

Fantastic new digital quartz watch powered by the sun, accurate to within 5 sec. a mo.—for less than $200! Bright LED display for 3-sec. reading of hr., mins., secs. at press of button; press again for self-correcting (except leap yr.) calendar to flash mo., date. 9 silicon solar cells charge 2 sub-mini batteries (guaranteed for minimum 3-yr. life) to power quartz control oscillator. No moving parts in mechanism. Gold-plated case & band.

Stock No. 1675A.....$199.95 Ppd.

MAIL COUPON FOR GIANT FREE CATALOG!

172 PAGES • MORE THAN 4500 UNUSUAL BARGAINS

Completely new Catalog. Packed with huge selection of telescopes, microscopes, binoculars, magnets, magnifiers, prisms, photo components, ecology and Unique Lighting items, parts, kits, accessories — many hard-to-get surplus bargains. 100's of charts, illustrations. For hobbyists, experimenters, schools, industry.

EDMUND SCIENTIFIC CO.
300 Edscorp Building, Barrington, N. J. 08007
Please rush Free Giant Catalog "A"

Name_____

Address_____

City_____ State_____ Zip_____

COMPLETE AND MAIL WITH CHECK, M.O. OR CHARGE NO.

EDMUND SCIENTIFIC COMPANY
300 Edscorp Building, Barrington, N.J. 08007

How Many	Stock No.	Description	Price Each	Total

☐ SEND FREE 172 PAGE CATALOG "A".
☐ Charge my BankAmericard *
☐ Charge my Master Charge *

Add Handling and Service Charge $1.00

I enclose ☐ check ☐ money order for TOTAL $

My Card No. is

Interbank No.

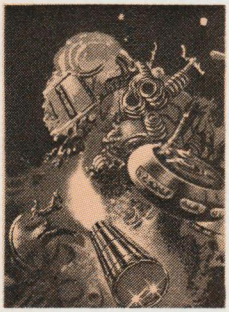
Signature_____

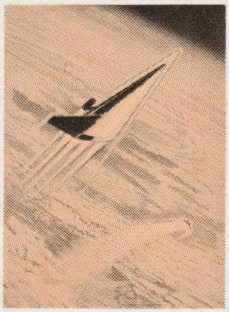
Card Expiration Date_____ NAME_____

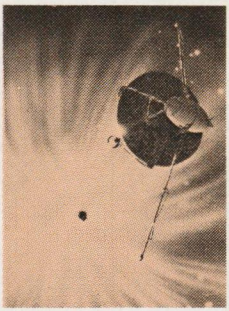
30-DAY MONEY-BACK GUARANTEE. You must be satisfied or return any purchase in 30 days for full refund.

ADDRESS_____

*$15.00 minimum CITY_____ STATE_____ ZIP_____







Analog covers available

Thanks to your great interest and demand, we now have available for sale a limited number of reprints of our 1975 covers. The reprints are in the same colors as originally published, without the printed material overlaying them. The reproductions are bordered with white stock, suitable for framing. Size is 9″ x 12″. Individual covers will cost $1.75. A set of two covers will be $2.50; three-cover sets, $3.25; all four covers, $4.00. Order now! (See the coupon inside the magazine.)

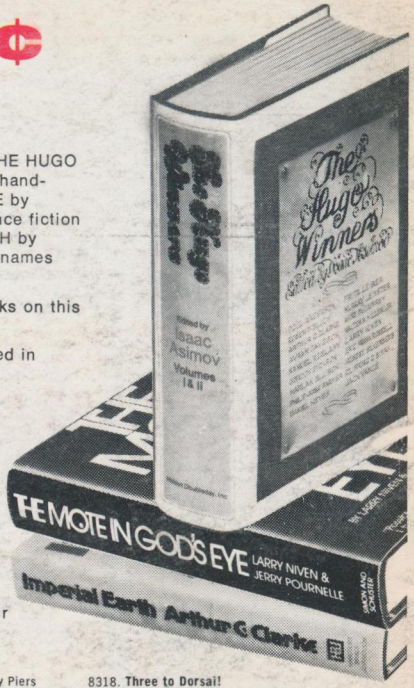
The very best reading in or out of this world

4 FOR 10¢ with membership

Choose any 4 books, including these science fiction greats: THE HUGO WINNERS, Volume I & II — 23 gripping short stories. A giant, handsome 864-page record of greatness. THE MOTE IN GOD'S EYE by Larry Niven and Jerry Pournelle. ". . . possibly the finest science fiction novel I have ever read."—*Robert A. Heinlein.* IMPERIAL EARTH by Arthur C. Clarke. The most recent novel by one of the biggest names in science fiction.

What a way to get acquainted. Browse through the list of books on this page and choose any 4 for just 10¢.

It's the most extraordinary sample of science fiction ever offered in one package.



Here's how the Club works:

When your application for membership is accepted, you'll receive your choice of 4 books for just 10¢ (plus shipping and handling). If not absolutely fascinated, return them within ten days—membership will be cancelled and you'll owe nothing.

About every 4 weeks (14 times a year), we'll send you the Club's bulletin describing the 2 coming Selections and Alternate choices. If you want both Selections, you need do nothing; they'll be shipped automatically. If you don't want a Selection, or prefer an Alternate, or no book at all, just fill out the form always provided, and return it to us by the date specified. We try to allow you at least ten days for making your decision. If you don't get 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 take only 4 Selections or Alternates during the coming year. You may resign any time thereafter, or remain a member as long as you wish. At least one of the two Selections each month is only $1.98 plus shipping and handling. Other extra-value selections are slightly higher but always much less than Publishers' Editions. Send no money. But do send the coupon today.

5652. **Ox.** By Piers Anthony. Follow the further adventures of Veg, Cal and Aquilon as they try to gain control over their strange new universe seemingly inhabited only by vicious machines. Special edition.

4085. **Buy Jupiter and Other Stories.** By Isaac Asimov. Here are 24 short stories that never appeared in other Asimov collections. **Buy Jupiter, Shah Guido G, Button Button,** and others. Highly entertaining. Pub. ed. $5.95

6221. **The Foundation Trilogy.** By Isaac Asimov. The ends of the galaxy revert to barbarism. An SF classic. Comb. Price $16.85

5587. **The Winter of the World.** By Poul Anderson. Hugo and Nebula author spins a tale of the future Ice Age and the hidden secret of the untameable and unconquerable Rogaviki people. Special Edition.

8318. **Three to Dorsai!** By Gordon R. Dickson. Packed with adventure and brilliant imagination, these complete SF novels **Neocromancer, Tactics of Mistake** and **Dorsai!** are by this popular Hugo and Nebula winning author. Special Edition.

0323. **The Wind's Twelve Quarters.** By Ursula K. Le Guin. 17 brilliant stories about time and space travel and alternate worlds. **Semley's Necklace, The Masters, The Day Before the Revolution** and more. Pub. ed. $8.95

8532. **The Hugo Winners, Vol. I & II.** Giant 2-in-1 volume of 23 award-winning stories, 1955 to 1970. Asimov introduces each. Pub. ed. $15.45

1412. **Imperial Earth.** By Arthur C. Clarke. A representative to Earth, from Titan, Duncan MacKenzie plans to solve an invention that threatens his homeland's economy. By Hugo, Jupiter and Nebula winning author. Pub. ed. $7.95

5637. **Epoch.** By Robert Silverberg and Roger Elwood, eds. Contains complete script of Ellison's winning screenplay **Demon with a Glass Hand.** Plus 24 original stories by other distinguished authors. Niven, Vance, Le Guin, Simak, others. Pub. ed. $10.95

3897. **The Mote in God's Eye** by Larry Niven & Jerry Pournelle. Man's first contact with an intelligent alien species. Pub. ed. $9.95

8037. **Again, Dangerous Visions.** Harlan Ellison, ed. Short stories and novels, 46 in all. **Explicit scenes and language may be offensive to some.** Pub. ed. $12.95

7112. **Fantastic Science Fiction Art: 1926-1954.** Lester del Ray, ed. 40 full-page, full-color reproductions of sci-fi magazine covers. Space ships, aliens, robots, and our heroes and heroines in futuristic costumes. Large size paperback on heavy stock. Pub. ed. $5.95

Science Fiction Book Club 45-S119
Dept. JR260, Garden City, N.Y. 11530

I have read your ad. Please accept me as a member in the Science Fiction Book Club.

Send me, as a beginning, the 4 books whose numbers I have indicated below, and bill me just 10¢ (plus shipping and handling). I agree to take 4 additional books during the coming year and may resign anytime thereafter.

Mr.
Mrs.
Miss _____
Please print

Address _____ Apt. ____

City _____ State _____ Zip ____

The Science Fiction Book Club offers its own complete hardbound editions sometimes altered in size to fit special presses and save members even more. Members accepted in U.S.A. and Canada only. Canadian members will be serviced from Toronto. Offer slightly different in Canada.