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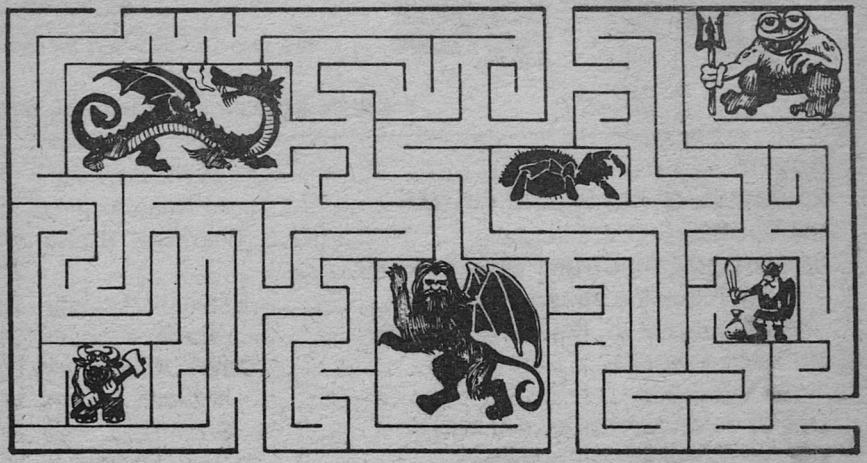

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Vol. 2, No. 5 (whole no. 9): Sep.-Oct. 1978

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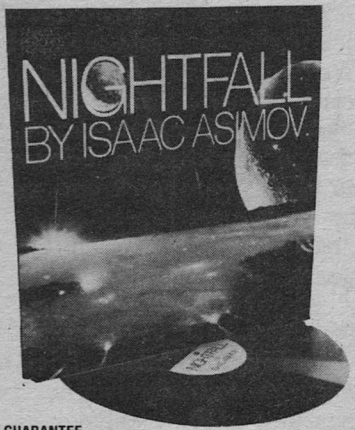

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EDITORIAL: BY NO MEANS VULGAR

The Latin word "populus" means "people"; the Latin word "vulgus" means "people."

In English we have the word "popular" and the word "vulgar", both referring to attributes of the people. We can have, for instance, "popular elections," meaning elections in which the people generally, rather than privileged individuals only, can vote. We can also have the "vulgar tongue," meaning the language of the general multitude, rather than the Latin of the learned classes.

Of course you can, by "people," refer to all the population without distinction. You can, on the other hand, refer only to most of them and apply the word to the "common people" as distinct from the "better classes"—better through birth, education, or self-esteem.

You can, if you are of democratic mind, use the adjectives in a favorable sense and think highly of anything characteristic of the people. Or, if snobbish, you can use the adjectives in an unfavorable sense, and assume that anything that pleases many is bound to be inferior since only a long process of cultivation can raise the level of taste to your own refined pitch.

In our English language, we have differentiated these two meanings, and "popular" has come to represent the favorable aspects of the general taste, while "vulgar" represents the unfavorable ones. Thus, Shakespeare has Polonius advise his son: "Be thou familiar, but by no means vulgar."

In French, I believe the distinction is less clear. I have, for instance, been described in French as being involved in the "vulgarization" of science. That would raise my hackles were it not that the surrounding sentences made it clear that praise was intended.

In English, however it is only possible to say that I am a "popularizer" of science. Should anyone try to say I am a "vulgarizer" of science, he had better be a friend of mine and he had better be smiling when he says it.

Yet I cannot help but feel that to some scientists there is no

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such thing as "science popularization"; there is only "science vulgarization."

Why? For the usual reason—snobbery.

It is not surprising to find a scientist feeling himself to be a member of an intellectual aristocracy. To reach the level of professionalism in science requires a kind of intelligence, curiosity, dedication, and patient training that is not very common. Because it is not common, there is a tendency to think it is superior.

There are, of course, two ways to react to superiority (real or fancied). You can decide that to possess more of talent or privilege confers upon the possessor special obligations ("noblesse oblige"). The true gentleman, who occupies a favored position in society, has standards of behavior and courtesy not expected nor required of a commoner and these standards must apply, as far as possible, to all, and not to other gentlemen, only. Similarly, the true intellectual, who has attained a refined understanding of any segment of learning, is required to make that learning available, as far as possible, to all and not to other intellectuals only.

On the other hand, you can react by assuming a wide gulf between yourself and those less favored; one that cannot be crossed at all if the difference is one of caste, or that can be crossed only by heavy exertion on the part of the unfavored one if the difference is one of training or education. In this case, for a favored one to extend a helping hand across the gulf is not done; it is "vulgar" and it gives rise to the suspicion that the helper is perhaps not truly a member of the upper class.

Naturally, my own outlook is that of "noblesse oblige" or I wouldn't be in the profession I occupy.

Nor is this a matter of personal predilection alone. To me, the intellectual "noblesse oblige" has become a matter of life and death for society. Consider:

1) Science is no longer the private concern of a few ardent souls intent on plumbing the mysteries of the Universe out of personal curiosity. Science cannot be a private concern as long as it depends on the public purse—and these days it does just that. It depends on it directly, through the tax funds granted scientific projects by the government; or indirectly, through industrial support which is made up for by an appropriate increase in the pricing of goods and services.

2) Science is no longer divorced from the public good or evil, as it once was when it lived in an ivory tower (or fancied it did so). Scientific advance can easily produce something that will,

wittingly or unwittingly, serve to destroy civilization—or save it.

3) Science is no longer an activity that can be carried out by a few volunteers. We need many people trained in many levels of scientific accomplishment if our technological civilization is to work well, and these people can be drawn only from the general public and only by active proselytization.

Well, then, if the general public pays for scientific advance, it deserves to know as much about what it is paying for as it can—so that it may choose its manner of support intelligently.

If the general public's destruction or salvation depends on scientific advance, it deserves to know as much about what may destroy it or save it as it can—so that it can more intelligently behave in such a fashion as to guide the advance away from destruction and toward salvation.

If it is from the general public that the scientists and technicians of the future are to be drawn, then it deserves to know as much about the profession as it can—so that it can more intelligently choose a point of entry.

Each scientist is, of course, part of the general public. He or she pays taxes, endures the chance of technological destruction or salvation, suffers the possibility of technological breakdown through

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lack of trained personnel. Science popularization is therefore as necessary to the scientist as to anyone else, and if any scientist looks upon it as science "vulgarization", he is an ass. —And a dangerous one, too.

It is twenty years now since I gave up formal classroom work, and I am sometimes asked if I miss it, or if I feel guilty about having "abandoned" teaching. My answer is "No," for I have abandoned neither my teaching nor my classes. I still teach through my books and lectures, and reach a far larger "class" in more fields, than ever I did in the classroom.

I am also asked if I regret "no longer being a scientist." The answer to that is also "No," for I am *still* a scientist. In fact, since I devote my almost every waking hour to teaching all whom I can reach, which I consider the very first duty of any scientist at any moment when not actively engaged in research, I feel myself to be more a *working* scientist than ever.

All this has a sharp application to science fiction. Teaching science may not be the primary function of science fiction, but *mis*-teaching science should be anathema to it.

If you take your spaceship to Titan, there is no need to make

your story into a travelog, nor need you feel compelled to give the vital statistics of the world you're landing on. You might do so, if you can weave it into the story skillfully enough, but it is not necessary.

Under no conditions, however, should you describe Titan as a satellite of Jupiter (which it isn't) rather than one of Saturn (which it is).

Mistakes can be made. Writers are only human. George Scithers is only human. Even I am occasionally only human. In a previous issue, an illustration, taken in conjunction with the story, *did* imply that Titan was a satellite of Jupiter, and for that we apologize.

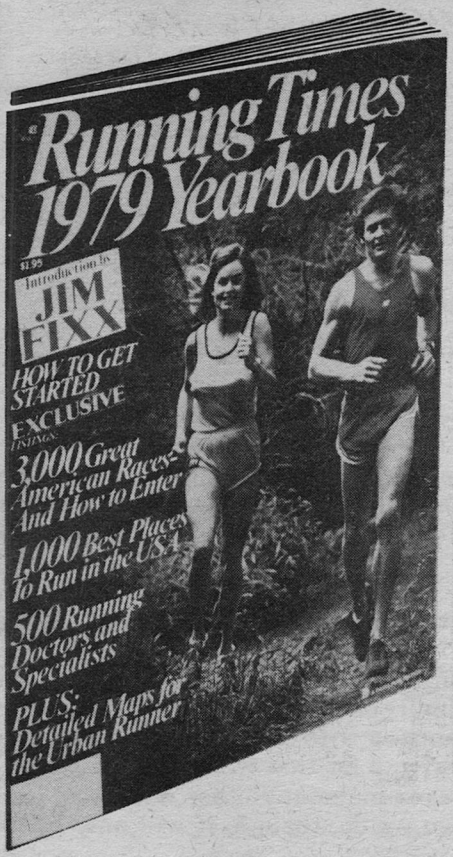
I don't guarantee we will never make any other mistakes. I am sure we *will* make them. When we do, though, it will only be despite out best efforts not to.

We are *not* among those who say, "Who cares about scientific minutiae? The story's the thing."

We are *not* here to bring you stories; we are here to bring you *science fiction* stories. And you can't have good science fiction stories with bad science.

So, to you aspiring science fiction writers out there—you need not feel you must have a graduate degree to write (be thou familiar); but you must learn enough science to bear the load of the particular story you want to write (but by no means vulgar).

—Isaac Asimov



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ON BOOKS
by Charles N. Brown

The Stars in Shroud by Gregory Benford: Berkley/Putnam, 1978, 273pp, $8.95.

The Far Call by Gordon R. Dickson: Dial/James Wade, 1978, 413 pp, $8.95.

The Long Way Home by Poul Anderson: Ace, 1978, 248pp, $1.50 (paper).

Question and Answer by Poul Anderson: Ace, 1978, 147pp, $1.50 (paper).

The Night Face by Poul Anderson: Ace, 1978, 145pp, $1.50 (paper).

The Peregrine by Poul Anderson: Ace, 1978, 184pp, $1.50 (paper).

The Man Who Counts by Poul Anderson: Ace, 1978, 209pp, $1.50 (paper).

World Without Stars by Poul Anderson: Ace, 1978, 150pp, $1.50 (paper).

Dreamsnake by Vonda N. McIntyre: Houghton Mifflin, 1978, 313 pp, $8.95.

Millennial Women edited by Virginia Kidd: Delacorte, 1978, 299pp, $8.95.

Persistence of Vision by John Varley: Dial/James Wade, 1978, 279 pp, $9.95.

Blind Voices by Tom Reamy: Berkley/Putnam, 1978, 213pp, $7.95.

Stormqueen! by Marion Zimmer Bradley: DAW, 1978, 368pp, $1.95 (paper).

The Complete Guide to Middle-Earth by Robert Foster: Del Rey, 1978, 575pp, $10.00.

The Encyclopedia of Science Fiction and Fantasy: Volume 2: Who's Who, M-Z by Donald H. Tuck: Advent, 1978, 250pp, $25.00.

The Eyes of the Overworld by Jack Vance: Underwood/Miller, 1978, 285pp, $15.95.

The Roots of Horror in the Fiction of H.P. Lovecraft by Barton Levi St. Armand: Dragon Press, 1978, 102pp, $9.95.

Does anybody know what the following books have in common? *Grandmother and The Priests, City of Night, The Glass-Blowers, The Sand Pebbles, The Battle of the Villa Press.* How about this list? *The Space Merchants, Childhood's End, Fahrenheit 451, More*

Than Human, Out of the Deeps.

The first list is of general novels which were all best sellers ten years ago. As far as I can tell, most if not all of them are out of print and forgotten. (A pity in the case of *The Sand Pebbles* by Richard McKenna, a prize-winning novel by an excellent writer whose only book in print is *Casey Agonistes*, a highly recommended collection of science fiction.)

The five science fiction novels on the second list were published by Ballentine Books within a few month period twenty-five years ago. All of them are still in print, still earning royalties, and are still fresh after a quarter of a century (you should be able to name the authors without any trouble).

There are many exceptions, but in general, a science fiction book tends to have a longer life span than a general novel. Authors who wrote hurriedly for penny-a-word markets years ago and accepted many editorial changes are now having second thoughts. They're doing some rewriting as they ready their earlier, somewhat simpler tales for re-entry into the literary world. After all, these books may be around a long time.

Sometimes the changes are merely cosmetic—restoring cut passages, a little smoothing of the language, corrections of typographical errors; and, as with *Ringworld* by Larry Niven, corrections of background which do not affect the main story. These changes are always welcome by everyone except bibliographers, and I will try to note them as often as possible.

Sometimes the changes add a certain depth of characterization and motivation to a fairly simple story. John Brunner and Robert Silverberg have both done this to earlier work. It doesn't usually detract from a book, but is usually unsuccessful in the long run. The better books are normally plotted by determining how specific characters with specific motivations react in certain situations. The reversal, as with a new coat of paint on an old chassis, can turn minor inconsistences into major faults.

The third type of rewrite is the hardest for the author, but the most satisfactory in the long run. It consists of throwing out everything but the basic structure and rewriting line by line. The most successful book of this type is Arthur C. Clarke's *The City and the Stars,* the rewritten version of *Against the Fall of Night.* Clarke was so successful that both versions are usually in print.

Gregory Benford, one of the best science fiction writers working today, has both an impressive scientific background and a strong feel for characterization. The combination is rare and hard to

beat. *The Stars in Shroud* is a complete rewrite of his first novel, *Deeper than the Darkness* (1970). Comparing the two versions is a virtual course in writing. The original version was a moderately successful space opera with adequate prose. The new version is an attempt to fuse space opera plotting with realistic characterization and motivation. The prose is also impressive and the new fusion works about as well as I think it can. The first half is excellent, but the added depths in the second half merely show how creaky space opera plotting really is. For the moment, I'm convinced that realistic writing and melodramatic plotting just don't work well together. In fairness to the author, please note that *The Stars in Shroud* is the third book in a four book series which opens with *In the Ocean of Night,* an impressive opening to any series. I'm anxiously awaiting books two and four, and I would love to be proven wrong about the realism versus space opera combination.

Gordon Dickson's *The Far Call,* an expansion of a 1973 serial, is a long novel about man's first manned trip to Mars. Most of the book is about the political problems involved. The space scenes and the picture of the space program are realistic and impressive, while the political infighting furnishes the melodrama. It's generally well written and is a successful "mainstream" SF book. I found it a bit too long, and if I sound unenthusiastic, it's because I get bored easily by political novels.

Ace Books has done an impressive job in repackaging a series of early books by Poul Anderson. The author has written new introductions, restored cuts, and has retitled most of them. *The Long Way Home* was first issued as *No World of Their Own* (1958). The present version restores the text and title of the magazine version. *Question and Answer* was called *Planet of No Return* in its 1956 incarnation; *The Night Face* is a retitling of *Let the Spacemen Beware* (1963); *The Peregrine* was originally called *Starways* (1956); and *The Man Who Counts* restores both the original magazine title and text to *War of the Wingmen. World Without Stars* (1967) is unchanged except for a new introduction. Although I rarely reread old books (for lack of time, not lack of interest), I couldn't resist these. Anderson is the best consistent writer of SF adventure we have, and all of these books are fine reading.

Dreamsnake by Vonda N. McIntyre is a novelization of her Nebula winning story, "Of Mist, and Grass, and Sand" and two other short pieces. It's a very good book with smooth writing, sympathetic characterization, good background, and almost suc-

cessful plotting. A technologically advanced city, which should be important, turns out to be a cardboard cutout; and the ending is too easy and simple for the complex earlier development. However, these are only annoying because the rest of the novel is so good. The book really needs a sequel. A paperback publisher (Dell) seems sure *Dreamsnake* will be an award winner next year and has backed up its judgement with a lot of money.

You would think that a new novel by Ursula K. Le Guin would be trumpeted as a major publishing event since she is one of our best writers; but "The Eye of the Heron", a 40,000 word story, is buried in an original feminist anthology, *Millennial Women,* edited by Virginia Kidd. I can understand why Le Guin would lend her prestige to such a book, and I hope it's successful despite too little publicity and an insulting packaging job. "The Eye of the Heron" is a serious, well written, and important exploration of the problems of a pacifist society faced with a major crisis. It's sort of a codicil to *The Dispossessed.* Le Guin, unlike the other five authors in this anthology, creates sympathetic and believable characters of both sexes and, in doing so, does more for equality than all the others combined. She also gives us a fine story which makes its points without any preaching. Don't miss it. The Le Guin novel is worth more than the price of the book it is unfairly buried in.

The publicity blurb for *The Persistence of Vision* by John Varley starts out by saying, "These nine stories show the best work of the decade's most exciting new science fiction writer." I fully agree and can't really add very much to it. I like some stories better than others, of course. The title story is my personal favorite with "In the Hall of the Martian Kings" not far behind, but that's just hair splitting. They're all good to excellent. *Persistence of Vision* is the best short story collection of the decade.

Tom Reamy, who only started writing professionally a few years ago, died suddenly last year at the age of 42. He left us with a handful of fine short stories and a novel. *Blind Voices* has a level of writing which would satisfy most writers at the peak of their career instead of at the beginning. It has a science fiction ending, but is mainly a superb creation of a small town in Kansas in 1930, the people who live there, and the bizarre freak show, in the tradition of *The Circus of Dr. Lao,* which arrives one hot summer's day. Don't miss it.

I was very disappointed in Marion Zimmer Bradley's last "Darkover" novel, *The Forbidden Tower,* and said so in no uncertain

terms. I'm happy to be able to recommend without reservation her newest book in the series, *Stormqueen!* It's an extremely long book, but, in this case, the more the better. Bradley has fully integrated background, philosophy, and plot in a novel second only to her superb *Heritage of Hastur* in this excellent series.

The Complete Guide to Middle-Earth by Robert Foster is a revised and enlarged edition of his 1971 concordance, *A Guide to Middle-Earth*. It adds all the information from *The Silmarillion* and is an indispensable companion for all lovers of Tolkien's world.

The long-awaited second volume of Donald H. Tuck's *Encyclopedia of Science Fiction and Fantasy* has finally appeared. It has biographies and bibliographies of authors in the second half of the alphabet. It's exhaustive, fascinating, and incredibly useful to anyone who collects science fiction. It's also expensive at $25.00, but well worth the price. The only problem is that it only covers material up to 1968, and we have to wait for the supplements which will make it a truly indispensable reference work. As with all small press publications, you will find it only in specialized bookstores. It can be ordered directly (and postpaid) from Advent: Publishers, Box A3228, Chicago IL 60690. Volume I is available at the same price.

A 1,500 copy edition of *The Eyes of the Overworld* by Jack Vance, with 14 excellent illustrations and a dust wrapper by Steve Fabian is available for $15.95 from Chuck Miller, 239 N. Fourth St., Columbia PA 17512. It's a beautiful book. There is also a signed limited edition which is probably sold out by now.

The Roots of Horror in the Fiction H.P. Lovecraft by Barton Levi St. Armand is a fine hardbound limited edition monograph of interest not only to Lovecraft fans, but to horror fans in general. St. Armand's analysis is clear, concise, and fascinating. It can be ordered directly from Dragon Press, Elizabethtown NY 12932.

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McCaffrey, Anne	THE WHITE DRAGON	Ballantine/Del Rey	8.95	6.95
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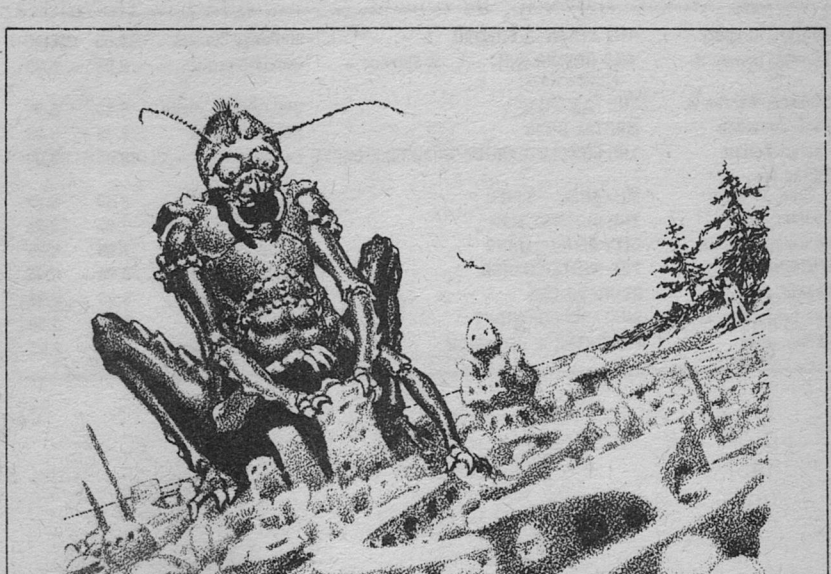
Van Lustbader, Eric	SHALLOWS OF NIGHT	Doubleday	6.95	5.50
Varley, John	PERSISTENCE OF VISION	Dial/James Wade	9.95	7.95

*PLEASE NOTE: ADD 10% TO DISCOUNT PRICE ON ALL CANADIAN ORDERS.

SOFTLY TOUCH THE STRANGER'S MIND

by E. Amalia Andujar

art: Michael Whelan



While the author still thinks of Chicago, a city in which she spent many years, as Home, she presently lives and works in New Haven CT, accompanied by her dog, Emily. (Emily, she notes, is not gainfully employed.) Ms. Andujar's work involves a laboratory and studies of chemical kinetics, which she claims "will kill her one of these days." Whether the reference is to the studies, the work, or the laboratory is not recorded. This story is her first sale.

"We are curious, Johalla. It has always been so. If there is a mountain, we will climb it. It will not remain untouched by us. And so it is with space. It is there. We must know what is in it."

The storm had been violent. The onslaught had permitted no time for evasive action.

The hull of the ship, as durable as anything in the universe, had not been damaged, but the shields had weakened, exposing delicate instruments to radiation. Sparks flashed from the panel. The odor of fused circuits tainted the air. Amber lights warned of danger.

Johalla disengaged relays, releasing the ship from automatic control. It responded sluggishly as he brought it about in a wide arc.

Before the advent of the storm, he had finished surveying a solar system. Deep within it, scans had revealed a planet compatible to the physiology of his species. Probes had also identified areas of dense population.

A pinpoint of light appeared in the monitor. As the ship drew nearer, the dot swelled, illuminating the screen.

Johalla coaxed the vessel into orbit around the globe, frantically searching the surface for an island. It was not as likely to be inhabited. One does not set down a disabled craft in the midst of a teeming metropolis.

"Remember, my friend, aliens are not predictable. They feel threatened by our presence. As often as they turn and flee, they will attack. Time has given little knowledge of the beings which populate this galaxy."

He cut into the planet's atmosphere, guiding the ship toward the small target. It skimmed the glassy-smooth water. Flip-flopping out of control, the vessel slashed across the island, plunged through the trees, smashing them to fibers.

The impact was shattering. It paralyzed him, suspended him in a well of pain. He moaned, waited unmoving for the hurt to subside, for silence to calm his battered senses.

Johalla fumbled with the harness, his aching claws catching the fabric of the protective garment which covered his angular frame. He pulled at it. Without it, fragments of shell and a green puddle would be the only remains of this creature who had dared to trespass against the galaxy.

He groped for the portal, hesitating before he released the cover. Every living being here must know of his arrival.

He pushed the hatch forward, peering out into the dusk. Strange forms intrigued him. He studied the terrain, eyes lingering on the trees, their silhouettes black against the heavens. His antennae quivered in harmony to the sounds and smells of the island.

Weary, he turned from all of it and sought comfort in dreamless sleep.

Noisy chattering awakened him. The forest, streaked by dawn, shivered with life. Johalla climbed from the ship.

The cool wind caressed his thorax, soothed his aching limbs. The surf rolling against the rocky shore seemed to echo his isolation. He looked at stately trees, at small creatures stalking the sky on fragile wings.

"How awesome it is to press one's feet against alien soil. How different it is, yet the same. The essence of the universe is there. To reach out and touch it; if only one could reach out and draw it in."

He cut branches from the trees torn by the ship's passage and formed a leafy shroud, shielding the vessel from view. He knew nothing of the inhabitants of this world, but many races throughout the galaxy were capable of mechanized flight.

Each instrument was checked for damage, a chore hampered by the confines of the ship. With the panels removed and the units spread about, there was little room for him.

His discomfort increased with the heat. The environmental system had been shut down, which left the air stagnant and heavy with the odor of scorched insulation.

At sunset, Johalla nibbled rations to appease gnawing hunger and watched the clouds gathering overhead.

Huge drops splattered the ground, dissolving into rivulets at his feet. Johalla shivered. The misty rains which refreshed his planet were nothing like this downpour.

He was fascinated by the thunder, the frenzy of the wind, the blinding sheets of water. Tentacles of fire flashed in the sky, driving him to the refuge of the ship. He wished for someone to share with him the excitement of these phenomena.

"It is not our nature to be alone, Johalla, but is the price of our endless missions into that dark void. Memories are as precious

jewels. Memories will sustain you, when isolation numbs your thoughts."

Puddles were now the only remnants of the storm. The morning was crisp with pungent odors, the foliage more vibrantly colored, but he had little time to ponder the beauty of nature. He returned to his tasks, laboring again until dusk.

The evening, so calm after yesterday's violence, aroused him. His spirits sent him prancing along the beach, dashing back and forth across the sand, teasing the waves.

Lured from his game by the forest, he ran among the trees, leaping over vines and bushes until the odor of burning wood halted his carefree journey. He stopped and sniffed the air.

The smoky wisps led him through the undergrowth to a clearing among the trees. In the center, logs burned brightly, casting shadows upon the barren ground. Johalla looked about him, seeking the cause of the strange patterns which stroked his mind. He discovered he was not alone.

The animal crouched near the fire. Slowly, it straightened, tense with fear.

Johalla's wings fluttered. He stumbled back into the shadows. His powerful legs sent him high into the trees.

From above, he watched the biped as it circled the clearing, thrashing the undergrowth with a stick. It was a small, frail beast. The soft, pulpy body, the pallor of its flesh made Johalla shudder.

Light swept the thick vegetation. Johalla dodged the beam. His eyes would mirror the ray a hundred-fold, exposing him.

The bough sagged beneath his weight. Needle-shaped growths tickled his abdomen. He pushed at them with his feet. The tree trembled with his every movement.

The animal continued to pace, twisting and jerking its head, wagging a response to the probing fingers of Johalla's mind. He could sense its terror.

The night seemed endless. His legs were stiff with cramps. With gentle thoughts, he tried to lull the creature from its frantic search.

Finally, the creature slumped against a tree, exhausted. It lay there, defenseless, a fragile orphan of the universe.

He climbed down. Branches swayed and broke under his weight. His great agility saved him from crashing to the ground in an undignified heap. Quietly, he made his way through the

forest, back to the ship.

"Although we seek them out, Johalla, we have yet to form a bond between ourselves and other species. How does one greet a stranger? What is the common ground on which we all might tread? What splendid gesture will forge the link?"

The sun was warm against his iridescent skin. Johalla tinkered with an instrument, carefully tuning its sensitive elements. Bored with the task, he set it down.

Memories nagged him. His actions last night had been those of a coward. The creature had been no threat to him. He was taller, stronger, but he had not faced it boldly. His noble feet had taken flight faster than his noble thoughts. His failure was no greater than that of his friends, but still, it was no less.

The undergrowth rustled, stopping his thoughts. Twigs snapped. The scent of fear was carried by the wind. Alert, Johalla watched the trees.

The animal leaped into the clearing, a black cylinder extending from an upper limb. Rigid with defiance, the native faced Johalla, exploding with hatred. Flame burst from the outstretched cylinder.

Johalla sprawled to the ground, his back smarting where the missile glanced off the bony ridge between his wings. He was uninjured, but stunned by the attack.

It fired again and again. Johalla's claws clicked in irritation, his head throbbed with anger. He tapped the weapon hanging at his belt, pulled it out, aiming it at a clump of bushes. They were blasted to ashes.

The creature scrambled through the trees, howling in terror.

The native's behavior had provoked Johalla's rage, but his retaliation sickened him. His mood was dark with shame.

The animal could not translate his thoughts. It feared him. The signals from its mind were sharp, hot spikes of passion, wounding his pride.

"When fear is present, one cannot communicate. It blinds, smothers expression of all other emotions and thoughts. To cut beyond that veil and softly touch the stranger's mind, to share its joys and sorrows. . ."

The chill of twilight calmed him, driving the demons from his

soul. He walked briskly, scanning the beach with keen eyes. The sands were cold beneath his feet. He quickened his steps. He had found what he was seeking.

It was a small tub made from tree fibers. The marks were still clear where it had been dragged from the water onto the beach.

He leaned over it, exploring the interior with his claws. He discovered a jagged hole, low in the bow. Perhaps this broken vessel had carried the native to the island. It must have been stranded here by the storm, unable to reach a safer port.

The device attached to the vessel's side reeked of hydrocarbons. Intrigued by it, Johalla ran his claw along the shaft, spinning the hard blades of the fan. Once, such primitive things had been common to his world, but now they were part of history.

"Our ancestors burrowed in mud. We build our shelters from plastic. Our life is hewn from molecules and atoms tailored to our wishes. And yet we are the same beings we were aeons ago, Johalla."

"We seek them out, our galactic kin, compelled to share our future with another race. We have no other reason for existing."

The odor of burning wood drifted across the beach. The image of the strange creature, squatting near the flames to warm itself, distressed him. Its loneliness somehow touched him, magnified his own feelings of isolation. He would not leave it here to die, with no companion to hear its lonely cries. Tomorrow he would mend the little tub.

At daybreak, Johalla returned with tools and adhesives. He covered the jagged hole with mesh, sealing it to the wood with plastic, carefully pressing the sticky substance into the crevices.

Flowers swayed in the gentle breeze, waiting for the sun's hot rays to awaken them. Graceful forms swooped above the water, stabbing the surface with yellow noses. The sea murmured quietly to the sky. This island pleased him.

Again the rustle of leaves and snapping twigs announced the stranger's presence. A deafening roar split the air. Johalla groaned in exasperation.

Claws snapping in anger, he sprinted across the beach in pursuit of the fleeing native.

The creature staggered and fell before it could reach safety. Johalla snatched the loathsome cylinder from its grasp. The animal cowered at Johalla's feet, moaning, its thoughts red with hor-

ror. The sting of its hatred filled him with despair. He turned from the animal, walked back to the tub, dragging the weapon behind him.

"We have accomplished nothing. So much time spent in that cold emptiness, with only rocks and stones to mark our journeys. How vain we are to think that other beings would wish to call us friends.

"Their existence intensified my loneliness. The portals to their minds seem forever closed against us. I longed to return home. It was like a magnet drawing me back from the stars. I had to submit to it. It will happen to you, Johalla. You will come home one day and never go back out there again."

Johalla applied another coat of plastic to the tub. Later, he would check the craft for leakage. The alien stayed near the trees, watching him as he worked. He tried to ignore it; its wrath, its raging thoughts.

Memories of youthful games tugged at his soul, combing out the anger and the hurt. He traced circles in the sand with his feet and molded wet grains into mounds of various sizes and shapes.

He listened to the cries of the small winged beasts hovering near the water. He remembered other places from his past, their citizens shrouded in mystery, alien and unyielding.

He fashioned castles like the dwellings he had seen in a distant land, dug rivers, paved the winding streets with pebbles from the shore. With tiny bits of wood he bridged the make-believe canals.

He was pleased with his creation, as much as he had been in his youth when he had made his dreams from mud and clay. Today, however, no guardian would chastise him for tracking soil into the tunnels.

A shadow crossed his fantasy, pulling him back from his childish retreat. He found himself staring into the eyes of the native, not knowing how long he had been watched. The patterns of its mind were smooth now, untinted by distrust. It moved slowly to Johalla's side.

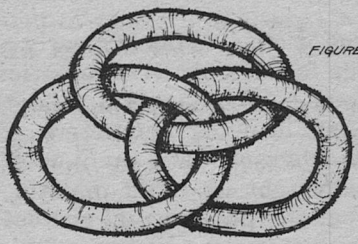
It built its own castles from the sand and placed them among Johalla's, then surrounded them all with a miniature forest of leafy twigs.

When darkness came, they gathered wood and shared the warmth of a fire. Johalla's thoughts flowed with the rhythm of the sea. Softly, he touched the stranger's mind; his joy was echoed in the pounding surf.

THE TOROIDS OF DR. KLONEFAKE

by Martin Gardner

art: Marian Meschkow



It was not until the third decade of the twenty-first century that Dr. David Klonefake at GIGE (Geneva Institute of Genetic Engineering) succeeded in producing a one-celled marine organism, almost microscopic, with a form like a torus. A torus is the topologist's term for a surface topologically the same as that of a doughnut. The animals are called *Toroidus klonefakus*, more commonly known as toroids.

Toroids reproduce from buds that grow on their surface. The buds quickly enlarge to flexible rings which then break away from the "mother" and swim about by means of hundreds of tiny flagella that cover the surface like fine hair.

A fully grown toroid is not normally linked to its mother, but sometimes it grows in such a way that it is permanently interlocked with the parent or with a sibling. It is not uncommon to find three toroids linked in the curious manner shown in Figure 1, known to the topologists as Borromean rings. Study the picture and you will see that no two animals are interlocked, yet all three are linked. If one is eaten by a larger life form, the other two become free of each other.

Dr. Klonefake's assistant had been observing toroids for months under a huge magnifying lens, trying to classify all the distinct ways they become linked. "This is incredible!" she exclaimed one morning. "Here's a colony of about 50 toroids, linked in a circular chain like a necklace. There's no way one of them can break loose. But if any toroid is eaten, all the others instantly are unlinked!"

Dr. Klonefake couldn't believe it until he came over and saw for himself. Can you conceive of how the toroids were linked to one another? For a solution, see page 122.

MICHAEL WHELAN
by Ginger Kaderabek

One of cover artist Michael Whelan's early memories is of going through crates of his father's old science fiction magazines, poring over the illustrations before he could read the words. After he could read, he began drawing characters and scenes from his favorite stories; but it wasn't until the now-27-year-old artist was in college that he thought he could make a living as an artist. He's "still amazed" at the phenomenal success he has achieved as a science fiction illustrator since he began his career in late 1974.

Whelan was born in Culver City CA, but his father's aerospace job moved the family about every year and a half to different areas of California and Colorado, Whelan said in a recent interview. His frequent moves left the young Whelan alone a good deal to read and draw.

There were always science fiction books and magazines around the house, and his father took him to all the science fiction and horror movies at local theatres. As Whelan recently said, "I couldn't help but get into it. But I was brought up to think of my involvement in science fiction as something to outgrow. It's been hard to shake the feeling that science fiction is immature."

He started drawing on his own, but his first taste of serious work in art came at age 15, when he studied during the summer at the Rocky Mountain School of Art in Denver CO. One of his instructors was Phil Steele, who had drawn for the "Captain Easy" comic strip; Whelan remembers being very impressed that a comic artist could also be a fine artist.

In the studio environment that summer, says Whelan, for the first time, "I really felt like an artist. I felt serious about my work; I felt committed to it. Like many artists, I have pleasant recollections of my first romance with the studio, which includes everything from the smell of the turpentine to drawing with a real model."

Despite his enjoyment of that summer and his long-time fascination with fantasy and science fiction, he "fooled himself" into believing he could shelve those interests and become "something legitimate like an anatomy instructor." However, by the time he was a junior in college, he realized that he had to become an artist "whether I could make a living at it or not."

While at San Jose State University, from which he graduated in 1973 with Great Distinction and as a President's Scholar, Whelan took several anatomy and pre-med courses. He also earned extra money by preparing cadavers for anatomy classes; his study of human musculature has helped him draw people for his covers without using models. This help is not limited to humans, he said, since understanding "how a body works and how it was constructed to work in its environment has been invaluable to me in creating believable aliens."

On his decison to pursue a career as an illustrator, Whelan said, "I was really insecure about my ability to make a living as an artist. Whenever I considered it, it seemed like someone would mention the 'incredible' competition." A professor at San Jose State convinced him he was good enough to compete, so after graduation Whelan went to the Art Center College of Design in Los Angeles to learn the necessary skills to sell himself in the commercial art field. He then moved to the metropolitan New York area to pursue his dream of being a science fiction illustrator.

Whelan had very definite ideas on how he wanted to make his appearance. Many of his art professors had told him that commercial artists usually worked their way up to editorial illustration after starting out doing paste-up work and other lower jobs in an art studio. "I knew I couldn't bear working that way so I decided to put together such a knock-out portfolio that I would be hired right away."

Whelan felt fairly confident when he came to New York because he had sent slides of his work to Donald Wollheim of DAW Books, and Wollheim had been interested in his work. Also, just before moving he had entered his first big science fiction art show—the art show at Discon II, the 1974 World Science Fiction Convention in Washington, D.C. There he won the award for best fantasy art in the professional category, even though he had never had a picture published. "I was really surprised, but it sure helped my self-confidence," Whelan said.

Whelan's plan worked.

He did the cover for DAW for *The Enchantress at World's End* by Lin Carter in November 1974 and has painted approximately 75 paperback covers since then. He has continued to work for DAW but also works for Ace Books, Ballantine, and Avon. In addition, Whelan has done hardcover dust jackers for Doubleday Science Fiction Book Club and Random House; magazine cover

and interior art for Marvel Comics, Inc. and *Gallery*; medical illustration for *The Journal of Bone and Joint Surgery*; and movie poster work for Continuity Associates.

His work for this issue of *IA'sf* is his first illustration for a science fiction magazine. Most science fiction illustrators began by working for the magazines, but Whelan said, "I can't say why I didn't go to the magazines. It could have been because they had a reputation for paying less, but I think it's just that I gave paperbacks my first shot and it worked."

Of his career thus far, he explained: "I never experienced any real problem getting work. I didn't want to experience the frustration of pounding the pavement, so I set my sights on certain publishers and went for them. Everyone told me I would be ripped off at first by the publishers, but I can't say that's really happened, though not for lack of effort on their part. I'm still thrilled at the idea of being able to make money at something I always wanted to do."

Whelan has received much recognition for his covers for the reissues of H. Beam Piper's "Little Fuzzy" books, for the "Elric" series by Michael Moorcock, and for his numerous cover paintings for Marion Zimmer Bradley's works. His work has won top prizes at most of the science fiction art shows in which it has been entered. His upcoming works include wraparound covers of reissues of Anne McCaffrey's *Dragonflight* and *Dragonquest* and her new "Dragon" book, *White Dragon*.

But Whelan's major project now is the fulfillment of a lifelong dream—painting the covers for Edgar Rice Burroughs's "John Carter of Mars" series for reissue by Ballantine Books. As a child, he drew pictures from the John Carter books, and it was sketches from the series that got him accepted by the Rocky Mountain School of Art. "I never thought I'd get the chance to do John Carter," he commented.

The 11 wraparound covers are the only major illustration work Whelan has scheduled through September because, he said, he's approaching the series with "committment." "I'm determined to make the covers as faithful to Burroughs as is humanly possible." In addition, he is working on a book of his own work to be published by Donning Publishers, Inc., publishers of *Frank Kelly Freas: The Art of Science Fiction.*

Whelan said accuracy in illustration is very important to him. "Sometimes I'm asked to do a symbolic portrayal of the story, but usually the art director is after a realistic action scene. If I'm only

given a synopsis or one chapter, it's so hard to get a feel for the characters. It's even more frustrating if a description of the hero or villian isn't even in the scene I'm to do. Luckily, I'm now in a position to insist on seeing the whole book."

When he gets a new manuscript, Whelan reads it and then spends an "agonizing day or two trying to give birth to a visual form to express my feelings, the author's intent, and the thematic content of the story. Each book demands a different approach. A lot of artists approach each cover they do in the same way, but I think the author deserves better than that."

About the current science fiction illustration field, Whelan said, "I think the state of the field is great. I'm excited by what seems to be a rebirth of interest by major book publishers in illustrated science fiction and fantasy."

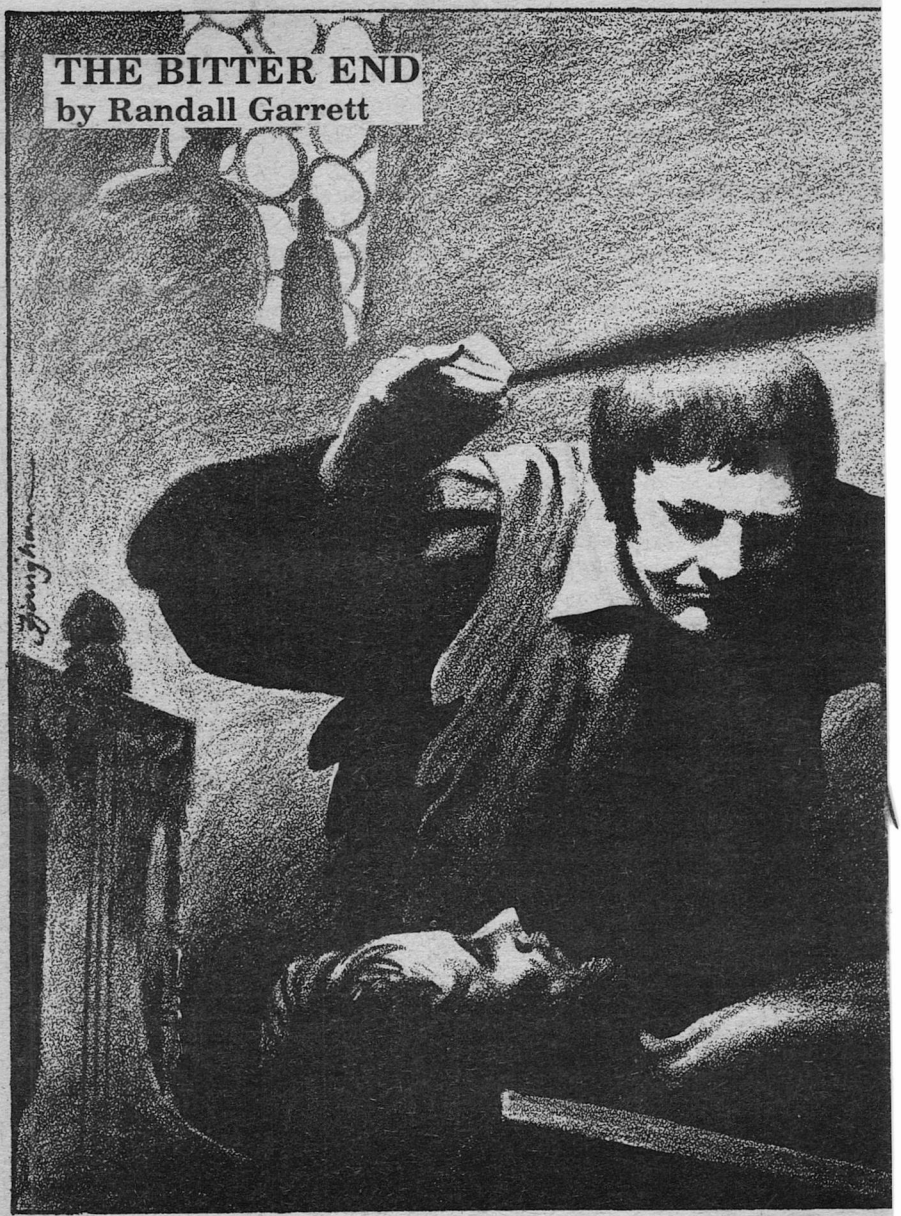
He noted that editorial illustration had always paid less than other types of commercial art. "Only now are prices beginning to equal the level enjoyed by illustrators in other commercial art fields." Yet, Whelan added, "Most science fiction arts seem to care more about their work than the average commercial artist. They put a lot of time into their work and are emotionally involved with it."

Technical training was an absolute necessity for him, Whelan said. "In college, there were really only four or five classes worth my trouble, but it was worth the whole stay there and the student loan payments I'm still making just to get those. I had to have the technical training to learn the skill to render what my mind conceives," Whelan said.

Although illustration is his first love, Whelan may be moving gradually toward doing more uncommissioned work. "I like the graphic imagery of science fiction, but I would like my work to give that 'sense of wonder' without necessarily having a story to explain it."

Whelan lives in Brookfield CT, with Audrey Price, whose help Whelan said has been "invaluable." They are pictured on Whelan's cover painting for Alan Dean Foster's anthology *With Friends Like These.*

THE BITTER END
by Randall Garrett



art: Jack Gaughan

In our time line, Richard the Lion-Hearted was killed in a minor battle in France at age 42; in another, he might have lived long enough to build an Anglo-French empire ruled to this day by Plantagenet Emperors, in a world, moreover, in which the psychic arts received as much attention as the physical ones have in our own time line. And who's to say which time line is imaginary, which one merely real?

I.

Master Sean O Lochlainn was not overly fond of the city of Paris. It was a crowded, noisy, river port with delusions of grandeur brought on by memories of ancient glory.

That it had been the seat of the ancient Capetian Kings of France, there could be no denying; that the last of the Capets had been killed in 1215 by Richard the Lion-Hearted and that more than seven and a half centuries had rolled past since then were equally true facts, but Parisians would have denied both if they could.

One of the very few places Master Sean felt comfortable in all that vast city was here, in the International Bar of the Hotel Cosmopolitain. He was wearing ordinary gentleman's traveling clothes, not the silver-slashed blue that would proclaim him a Master Sorcerer, nor the insignia that would identify him as the Chief Forensic Sorcerer for Prince Richard, Duke of Normandy.

It was four o'clock of a pleasant October evening, and the shifts were just changing in the International Bar, a barman and two waiters going off duty and being replaced by their evening counterparts. It meant a lull in service for a minute or so, but Master Sean didn't mind; he still had a good half-pint of beer in his mug, and the stout little Irish magician was not a fast drinker.

It was not the best beer in the world; in the Anglo-French Empire, the English made the best beer, and the Normans the second best. There were some excellent wines available here, but Master

Sean usually drank wine only with meals. Distilled spirits he drank only on the rarest of occasions. Beer was his tipple, and this stuff wasn't really *bad,* it just wasn't as good as he preferred. He sighed and took another healthy swig.

He had time to kill and no place else to kill it. He had to catch the 6:05 train west for the ninety-odd mile trip to Rouen, which gave him two more hours of nothing to do.

On the floor at his feet was his symbol-decorated carpetbag, which contained not only the tools of his profession but, now, the thaumaturgical evidence in the Zellerman-Blair case, which he had come specifically to Paris to get from his colleague, the Chief Forensic Sorcerer for His Grace, the Duke D'Isle. Anyone noticing that carpetbag closely would immediately recognize Master Sean as a sorcerer, but that was all right; he was not exactly traveling incognito, anyway.

"Would ye be ready for having another one, sir?"

Master Sean lifted his eyes from his nearly empty mug and pushed it across the bar with a smile. "I would indeed," he said to the barman. "And might that be the lilt of County Meath I'm hearing in your voice?"

The barman worked the pump. "It would," he said, returning the smile. "Would yours be the north of Mayo?"

"Close you are," said Master Sean. "Sligo it is."

There were not many people in the International. Six people at the bar besides Master Sean, and a dozen more seated at the booths and tables. The place wouldn't be really busy for an hour or so yet. The barman decided he had a few minutes for a friendly chat with a fellow Irishman.

He was wrong.

One of the waiters moved up quickly. "Murtaugh, come here," he said in an urgent undertone. "There's something funny."

Murtaugh frowned. "What?"

The waiter glanced round with warning eyes. "Come."

The barman shrugged, came out from behind the bar, and followed the waiter over to a booth in the far corner. Master Sean, as curious as the next man if not more so, turned round on his barstool to watch.

The room was not brightly lit, and the booth was partly in shadow, but the sorcerer's keen blue eyes saw most of the detail.

There was a well-dressed man sitting alone in the booth. He was in the corner of the booth, against the wall, and his head was bent down, as though he were looking intently at the newspaper

which his hands held on the table before him. To his right was a drinking glass which was either completely empty or nearly so; it was hard to tell from where Master Sean sat.

The man neither moved nor spoke when the barman addressed him. The barman touched one of his hands to attract his attention. Still nothing.

Master Sean's common sense told him to stay out of this. It was none of his business. It was out of his jurisdiction. He had a train to catch. He had— He had an insatiable curiosity.

A magician's senses and perceptions are more highly developed, more highly trained, and more sensitive than those of the ordinary man. Otherwise, he would not be a magician. Master Sean's common sense told him to stay out of this, but his other senses told him that the man was dead and that this was possibly more complex than appeared on the surface.

Before the barman and the waiter could further disturb anything on or near the booth, Master Sean grabbed his carpetbag and walked quickly and unobtrusively over to the booth.

But he found that he had underestimated the sagacity and quickness of mind of his fellow Irishman. Barman Murtaugh was saying: "No, we don't touch him, John-Pierre. You go out and fetch an Armsman and a Healer. I'm pretty sure the feller's dead, but fetch a Healer all the same. Now move." As the waiter moved, Murtaugh's eye caught sight of Master Sean. "Please go back to your seat, sir," he said. "The old gent here's been taken a bit ill, and I've sent for a Healer."

Master Sean already had his identification out. "I understand. I don't think anyone else has noticed. The both of us could stand here while John-Pierre's gone, but that might attract attention, were you to be from your post so long. On the other hand, *I* can stand here and pretend to be talking to him, and no one will be the wiser. Meantime, you can get back to the bar and take careful notice if anyone shows any unusual interest in what's going on at this booth."

Murtaugh handed the identification papers back to Master Sean and made up his mind. "I'll keep me eye out, Master Sorcerer." And headed back to his station.

II.

The uniformed Men-at-Arms had arrived, made their prelimi-

nary investigation, and sealed off the bar. There were several indignant patrons, but they were soon quieted down.

The Healer, a Brother Paul, checked over the body, and, after several thoughtful minutes, said: "It could be several things—heart attack, internal hemorrhage, drugs, alcohol. I'd have to get a chirurgeon to do an autopsy before I'd take an oath on any of them."

"How long would you say he'd been dead, Brother Paul?"

"At least half an hour, Master Sean. Perhaps as much as an hour. Call it forty-five minutes and you'd not be far off. Funny how he just sat there without falling over or anything, isn't it?"

Master Sean wished he had some official standing; he'd have his instruments out in half a minute and get some facts. "It's an old schoolboy's trick," he replied to the Healer's remark. "Surely you've done it yourself. You feel yourself getting sleepy, so you prop yourself up at your desk in such a way that you don't fall over—as he's done in the corner, there. Then you put your forearms on the desktop—in this case, tabletop—and put your reading material between them, so that it looks natural. Then you let your head go forward. If you've done it properly, you can go right to sleep and look as if you're reading unless somebody notices you're not turning pages. Or gets at the right angle to see whether your eyes are closed."

"That suggests he felt the drowsiness coming on," said Brother Paul.

Master Sean nodded. "He'd not likely react that way to a heart attack. If a man's that full of alcohol, he usually doesn't have enough control or presence of mind to pull it off properly. A drunk just puts his head on his forearms and goes to sleep. How about internal hemorrhage?"

"It's possible. If the bleeding weren't too rapid, he'd begin to feel drowsy and might decide a little nap would be just the thing," Brother Paul agreed. "Certain drugs, of course, would have the same effect."

Around them, Men-at-Arms were taking statements from the patrons of the International Bar.

At that moment, the front door opened, and a smoothly-dressed, rather handsome man with a dapper little mustache entered, accompanied by another Man-at-Arms. He stopped just inside the door, looked all around, and then said: "Good evening, my sirs. I have the honor to be Plainclothes Sergeant-at-Arms Cougair Chasseur. I am in charge of this case. Where is the body?"

"This way, my sergeant," said one of the Men-at-Arms, and led the newcomer over toward Master Sean and Brother Paul. The Healer was wearing the habit of his Order, so Sergeant Cougair said, "It is that you are the Healer who was called?"

The Healer bowed his head slightly. "Brother Paul, of the Hospital of St. Luke-by-the-Seine."

"Very good." The sergeant looked at Master Sean. "And you, my sir?"

The stout little Irish sorcerer carefully took out his identification, and with it the special card issued by the local Chief Forensic Sorcerer. Sergeant Cougair looked them over. He smiled. "Ah, yes. It is that you work with Lord Darcy of Rouen, is it not?"

"It is," said Master Sean.

"It is that it is a very great pleasure to meet you, my sir, a very great pleasure, indeed!" he bubbled. Then his smile faded and he looked rather dubious. "But is it not that you are a little out of your jurisdiction?"

"I am," Master Sean agreed. The atrocious Parisian manner of mangling the Anglo-French language had always set his teeth on edge, and the fellow's manner didn't help much. "I was merely being of some small assistance until you arrived. I have no further interest in the case." When talking to a Parisian, Master Sean's brogue vanished almost without a trace.

The sergeant's face brightened again. "Of course. But naturally. Now let us see what we have here." He turned his attention toward the corpse. "Without a doubt, dead. Of what did he die, Brother Paul?"

"Hard to tell, Sergeant. Master Sean and I agree that the two most likely causes of death are internal hemorrhage—possibly of the cerebral area, more likely of the abdomen. And, second, the administration of some kind of drug."

"Drug? You mean a poison?"

Brother Paul shrugged. "Whether a given substance is a drug or a poison depends pretty much on the amount given, the method by which it was given, and the intent of its use. Any drug can be a poison, and, I suppose, vice versa."

"It is that it killed him, is it not?"

"We of the Healing profession, Sergeant, use the word 'poison' in a technical sense, just as you do the word 'murder'. All homicides are not murder. Death caused by the accidental administration of an overdose of a drug is not poisoning any more than death by misadventure is murder."

"Ah, I see. A nice distinction," the sergeant said, looking enlightened. "What, then, of suicide?"

"There, if the intent was deliberate suicide, then it was intent to kill. That makes it poisoning."

"Most comprehensible. Very well, then; if we assume poisoning in your technical sense, is it that it is murder or suicide?"

"Why, as to that, Sergeant Cougair," Brother Paul said blandly, "I fear that is your area of expertise, not mine."

Master Sean had listened to all this in utter silence. He had no further interest in the case. Hadn't he said so himself?

But Sergeant Cougair turned to him. "Is it that I may ask you a technical question, Master Sean?"

"Certainly."

"Is it that it is at all possible that the deceased was killed by Black Magic?"

For what seemed like a long second, there was no sound in the room except for the murmur of voices from the patrons of the bar and the Armsmen who were questioning them. The question, Master Sean knew, was loaded—but with what?

He shook his head decisively. "Not possibly. If Brother Paul's estimate of the time of death is correct—and I tend to agree with him—then I was in this room when it happened. There is no way a death-dealing act of Black Magic could have been perpetrated against the deceased without my knowing it."

"Ah. I presumed not," the sergeant said. "I presumed that had you known of such you would have mentioned it immediately. But it was my duty to ask, you comprehend."

"Of course."

Then he turned to the Armsman who had been standing unobtrusively nearby, taking down everything in a notebook. "Is it that the body has been searched?"

"But no, my sergeant. We awaited your coming."

"Then we shall do so immediately. No. Wait. Has anyone identified the deceased?"

"But no, my sergeant. The barman and the two waiters claim never to have seen him before. Nor do any of the patrons admit to any knowledge of him."

"They have looked at him thoroughly?"

"But yes, my sergeant. We marched them by while Brother Paul held up the head for one to view."

"And none of them knew him. Incredible! Well, to work. Let us examine his person and discover what we may."

Before they could move the body out of the booth, however, a uniformed Sergeant-at-Arms came in through the door, spotted Sergeant Cougair, and hurried over. "A word with you, Chasseur?"

"Yes." The two of them walked to one side and talked for perhaps a minute in low tones. Even Master Sean's sharp sense of hearing could not make out the words. Psychically, all he could get was disappointment, frustration, and irritation on the part of Sergeant Cougair.

The uniformed sergeant departed and Sergeant Cougair came slowly, thoughtfully back to where Master Sean and the others were waiting.

"A disaster," he murmured. "Most unfortunate."

"What seems to be the trouble?" Master Sean asked.

"Alas! A family entire have been wiped out by gas. The illuminating gas, you comprehend. A most important family they were, too—not titled, but wealthy. All dead."

"A disaster, indeed," Master Sean agreed.

"What? The deaths? Oh, yes; that, certainly. But that was not the disaster to which I referred."

"Oh?" Master Sean blinked.

"But no. I referred to the fact that foul play is suspected in the deaths of the Duval family, and our entire thaumaturgical staff has been called upon to aid in the apprehension of the perpetrators of this heinous crime. I have no forensic sorcerer to aid me in my work. My case is considered of importance so small that I cannot get even an apprentice for some hours yet. Delay! My God, the delay! And meanwhile, one's prime piece of evidence slowly but most surely decomposes before one's veritable eyes!"

Master Sean glanced at his watch. Five after five. He sighed. "Why, as to that, my dear sergeant, I'll cast a preservative spell over the body if you want. No problem."

The sergeant's eyes lit up. "By the Blue! How marvelous! I will at once take you up upon your offer!"

"Very good. But clear the rest of these folk out of here. I don't want a bunch of undisciplined civilians gawping at me while I do my work."

"But I cannot let them go, Master Sorcerer!" the sergeant protested. "They are material witnesses!"

"I didn't say to let 'em go," Master Sean said tiredly. "I doubt if the Grand Ballroom of this hotel is being used this early in the evening. Get hold of the manager. Your men can keep them in

there for a while."

"Admirable! I shall see that it is done."

III.

Four men stood quietly in the echoing silence of an otherwise empty barroom. Three of them were Plainclothes Sergeant-at-Arms Cougair Chasseur and two of his Men-at-Arms. The fourth was Master Sorcerer Sean O Lochlainn. Brother Paul had, somewhat regretfully, returned to his duties at the hospital; having certified that the deceased was, indeed, deceased, he was no longer needed.

The three Armsmen stood well to one side, silent, unmoving. It is unwise to annoy a magician when he is practicing his Art.

Master Sean looked down at the body. The Armsmen had shoved a couple of tables together and reverently laid the corpse upon them as a sort of makeshift bier. They had carefully undressed it, and, even more carefully, Master Sean had examined the late unknown. He was, the sorcerer judged, a robust man in his middle fifties. The body was scarred in several places; five of them looked like saber wounds which had been neatly stitched by a chirurgeon, four others came in pairs, front and back, each pair apparently made by a single bullet. The rest were the sort of cuts and scrapes any active adult might accumulate. All of them were years old. Master Sean marked the location of each on a series of special charts which he always carried in his symbol-decorated carpetbag.

Moles, warts, discolorations, all were carefully and duly noted.

There were no fresh wounds of any kind, anywhere on the body.

None of this preliminary work was necessary for a preservation spell. That sort of thing was usually left for the autopsy room. But Master Sean was curious. When a man dies of mysterious causes practically in your lap, as it were, even the most uncurious of men would be interested, and Master Sean, both by nature and by training, was more inquisitive than most.

When the superficial examination was over, Master Sean took from his symbol-decorated carpetbag a featureless, eighteen-inch, ebon wand, half an inch in diameter.

That wand was not a glossy black. It was not even a dull, flat black. It was a fathomless black, like the endless night between the stars. It did not merely fail to reflect the light that fell upon

it, it seemed to absorb light as though it were somehow *reaching* for it.

Under the precise control of Master Sean's right hand and fingers and arm, that wand began to weave an intricate pattern of symbols, series after series of them, above and around the dead man.

Those watching could sense, rather than see, that within and through the body, filling its every cell to the outermost layer of skin and hardly half a hairsbreadth beyond, a psychic field, generated and formed by the master sorcerer's mind and will, began to form.

There was no visible change in the body as that eighteen-inch rod of light-absorbing night wove its fantastic spell, but every man there *knew* that the spell was having its effect.

When it was finished, the ebon wand slowed and stopped.

After a moment, Master Sean said, matter-of-factly: "There, now; he'll last as long as you need him to." And he put his wand away.

"Thank you, Master Sean," Sergeant Cougair said simply. Then, before he said another word, he took a couple of tablecloths from other tables and covered the body.

"I have seen that done many times, Master Sorcerer," the sergeant said then, "although never so quickly nor so gracefully. It has always seemed to me as a miracle."

"No such thing," said Master Sean rather testily. "I'm a thaumaturgist, not a miracle-worker. 'Tis simply a matter of applied science."

"Is it that I may ask what precisely happens?"

Sergeant Cougair did not know it, then or ever, but he had touched one of Master Sean's few weak spots. Master Sean O Lochlain *loved* to lecture, to explain things.

"Well, now, that's very simple, Sergeant Cougair," he said expansively. "As you may know, matter is made up of tiny little particles, so small that they could never be seen under the most powerful microscope. Indeed, it has been estimated that a single ounce of the lightest of 'em would contain some seventeen million million million million of 'em. This theory of small particles was propounded first by a Greek philosopher named Demokritos about twenty-four hundred years ago. He called those particles 'atoms' and so do we, in his honor. His hypothesis has been confirmed by thaumaturgical theory and by certain experiments done by men learned in the Khemic Art."

"I comprehend," said the sergeant, looking as though he really did.

"Very well, then; these atoms are always full of energy; they vibrate and buzz about, which helps in their Khemic activity."

"Ah!" the sergeant, with a light in his eyes. "I comprehend! Is it that it is your spell which causes the cessation of all this—this 'buzzing about', as you call it?"

"Good Heavens, *no!*" Master Sean fairly snapped. "Why if I were to do such a thing as that, the body would freeze solid in an instant, and everything about it would likely burst into flame!"

"My God." The sergeant was instantly sobered by the thought of this phenomenon. "Continue, if you please."

"I will. Now, pay attention. These atoms react with each other to form conglomerates, and these conglomerates can react to form other conglomerates, and so on. All substances are composed of conglomerates of atoms, d'ye see. They react because each conglomerate is seeking a condition which will impose the least strain upon itself."

"A most natural desire," Sergeant Cougair commented.

"Exactly so. Now, then, in a living human being, these processes take place under conditions controlled by the life force, so that the food we eat and the air we breathe are converted into the energy and the substances we need. But these processes do not stop when the life force has departed; simply, they are no longer controlled. The body no longer has any resistance to microörganisms and fungi. The body decays.

"Even without microörganisms or fungi, these activities continue uncontrolled. That's why meat hung in a butcher's ice house becomes tender as it ages; the flesh digests itself, so to speak.

"Now, what a preservative spell does is make those atomic conglomerates *satisfied*. They wish to remain at their present energy levels, to maintain the *status quo* at the time the spell was cast. They are—*satisfied*."

"It is that it kills the microörganisms, is it not?" the sergeant asked.

"Oh, aye. They can't survive under any such conditions as that."

Sergeant Cougair gave a slight shudder. "I shudder," he said, suiting words to action, "to think what it would do to a living man."

Master Sean grinned. "Nothing. Absolutely nothing. The life force of more highly organized beings resists the spell easily.

Why, if yonder gentleman has a tapeworm, I assure you the worm is alive. He may be getting pretty hungry, but I assure you the spell didn't kill him.

"The spell you see, is very unstable. It's a static spell, and so bleeds off in time, anyway, but—oh, too much heat, for instance, would break the spell. The conglomerates would be dissatisfied again."

"Such as in the tropics?"

"It rarely gets that hot, even in the tropics. But a very hot bath, say—almost hot enough to scald—would do the job."

Sergeant Cougair raised his hands, palms out. "I assure you, Master Sorcerer, I have no desire to give a corpse a hot bath—or any other kind." Then, more briskly: "And now let us discover what we may in and about the clothing."

There was the usual assortment of keys, a pipe, tobacco pouch, pipe lighter, coins in the amount of a sovereign and a half, forty-two sovereigns in banknotes, a fountain pen, and a brand-new notebook containing nothing but empty pages. The identification folder contained cards and papers showing that the bearer was Andray Vandermeer, a retired Senior Captain of the Imperial Legion. That, thought Master Sean, would account for the scars.

His present address was No. 117 Rue Queen Helga, Paris. An Armsman was instructed to go there and discover what he could. "If there is a wife, a child, or other relative, break the news gently. You do not know the manner of his death. It may have been a heart attack. You comprehend?"

"But yes, my sergeant."

"Positive identification can wait until we have arrived him at the morgue. Go."

The Armsman went.

"And now for *this* small object," the sergeant continued. He was holding an eight-ounce brown glass bottle full of liquid. "It has upon it the label of Veblin & Son, Pharmaceutical Herbalists. It contains, according to the same label, 'Tincture of Cinchona Bark'—now what would that be?"

"An alcoholic solution of vegetable alkaloids from a certain tree of New France," Master Sean said promptly.

"A poison?"

"Or a drug," Master Sean said. "Remember what Brother Paul said."

"Ah, certainly. But it may have been what killed him. If so, it was suicide, for we found it in his own coat pocket."

"What killed him didn't come from that bottle," Master Sean pointed out dryly. "It's still full, and the seal of the stopper is unbroken."

"What? Oh. You are quite right. But perhaps there is another bottle. Lewie, go into the Grand Ballroom and tell Armand to have all the suspects searched. Bring John-Jack back with you, and we will search this barroom."

"But yes, my sergeant." And off he went, leaving Master Sean alone with Sergeant Cougair.

"Sergeant," the stout little Irish sorcerer said carefully, "I would not presume to tell you your business, but while all this searching is going on, you might find out more about that medicine if you checked with the pharmacist who filled the prescription, and with the Healer who issued it. The stuff is taken for the cure of malaria, one of the few diseases a Healer cannot handle without such aids."

"That will be done in due time, Master Sean," said the sergeant.

"Why not now? Veblin & Son is just across the arcade in this very hotel."

Sergeant Cougair jerked his head down and looked again at the bottle in his hand. "So it is! But yes! You are correct! I thank you for calling it to my attention."

"Think nothing of it." Master Sean looked at his wristwatch. "And now, if you'll pardon me, I fear I must say goodbye. If I don't hurry, I shall miss my train."

The sergeant looked at him in astonishment. "But most certainly you shall miss your train, Master Sorcerer! You are a material witness and a suspect in a murder case. You cannot leave the city."

"I?" Master Sean was even more astonished. *"I?"*

"Certainly. It is an axiom of mine that the least likely suspect is the one most likely to have done it. Besides, I shall need you for the autopsy, to determine whether or not murder *has* been done."

Master Sean could only stare at him.

There were no words to be found for the occasion.

IV.

It is not wise to meddle in the affairs of wizards, for reasons

well known to the *cognoscenti,* and when Master Sir Aubrey Burnes, Chief Forensic Sorcerer for His Grace the Duke D'Isle, heard what Sergeant-at-Arms Cougair Chasseur had done, he definitely felt it was meddling.

Master Sir Aubrey did not hear about it from Master Sean. That stout little Irish sorcerer was perfectly capable of washing his own linen, but he had had to make a teleson call to Lord Darcy in Rouen to explain why he had missed his train, and he had used the official Armsmen's teleson to do it. And the grapevine is almost as efficient as the teleson.

That Chasseur was well within his rights to have detained Master Sean is not debatable; whether he should have exercised those rights is moot.

Having decided that it was partly his own fault for sticking his nose into the case in the first place, and still beset by curiosity in the second place, Master Sean decided that he might as well go ahead with the autopsy and with the similarity analysis of the contents of the bottle and the dregs in the glass.

He didn't do the actual operation himself, of course; that was not his area of competence. The actual work was done by a husky young chirurgeon from Gascony who looked more like a butcher's helper than a chirurgeon, but whose fingers and brain were both nimble and accurate.

By half past seven, the body had been all sewn up nicely, and was ready to be claimed by the wife—if and when she actually identified it as being that of S/Cpt Andray Vandermeer, I.L., Ret. The Armsman who had been sent to No. 117 Rue Queen Helga reported that a servant had informed him that Goodwife Vandermeer was out shopping and was not expected to return until about eight.

Master Sean, meanwhile, pondered the data he had at hand.

The tentatively-identified Vandermeer had most certainly died of an overdose of some as yet unidentified drug. A similarity analysis showed that it was the same drug as that found in the dregs at the bottom of the glass found on the table near him. The prescription drug bottle had contained exactly what the label said it did, and was most certainly *not* the alkaloid that had killed Vandermeer.

Master Sean looked over the notes he had made during the autopsy. The internal condition of the body . . . the liver . . . the kidneys . . . those lesions on the brain. . . .

The whole picture rang a very small bell somewhere in the re-

cesses of Master Sean's memory, but he couldn't quite bring up the data. He'd never *seen* a body in just this condition before, of that he was sure. No, it was something he had read or been told. But what? Where?

The beefy young chirurgeon rose from his desk across the room and came over to where Master Sean was sitting. He had a sheaf of papers in his hand. "Here's my report, Master Sorcerer," he said politely. "If there's anything you'd like to add or change. . ." He let the sentence trail off and handed the magician the papers.

Master Sean read the report carefully, then shook his head. "No changes, Doctor Ambro, and the only thing I'd like to add is the name of the poison. Unfortunately, I can't as yet." He smiled up at the younger man. "By the bye, I should like to compliment you on your skill and dexterity with a scalpel. I've never seen a neater job. There are some pathologists who feel that just because the—er—patient is dead, any old hack work will do."

"Well, Master," the chiruurgeon said, "I feel that if a man lets himself get sloppy with the dead, he'll soon get sloppy with the living. It generates bad habits. I owe a great deal to the Healing Art, and I feel that as a technician I should do my best to repay that debt. If it weren't for a great Healer, I wouldn't be a chirurgeon at all."

"Oh? How's that, Dr. Ambro?" Master Sean was curious.

Dr. Ambro grinned. "As a lad, I had my heart set on being a chirurgeon. I felt it was a useful and rewarding trade. Then I found I wasn't cut out for it—no pun intended."

"Really?" Master Sean raised an eyebrow. "You seem singularly apt at the work to me."

Dr. Ambro chuckled. "I couldn't stand the smell. I couldn't even operate on the practice cadavers. Fresh blood nauseated me. Opening the abdominal cavity was even worse. And the dead? Forget it. And it *was* the smell. Nothing else. I couldn't even stand the odor of a raw steak or side of pork."

"Ah, I see," said Master Sean. "An unusual phenomenon, but by no means unique. Pray continue."

"Nothing much to tell, Master. A fine old Healer, Father Debrett of Pouillon, cast a mild spell on me. Now I find the scent pleasant enough—rather like roses and lilies, if you follow me."

"Oh, certainly. A well-known procedure," the sorcerer said. "Well, I'm glad it was done; it would have been a shame to let your skill be wasted."

"Thank you , Master Sean; thank you very much."

There was a knock on the office door, and it opened. A massive, totally bald head with a smiling face and bushy black eyebrows appeared around the door. "Hullo, chaps. May I come in?" the intruder asked in a pleasant baritone.

"My dear Sir Aubrey!" said Master Sean. "Of course! Do come in!"

Master Sir Aubrey Burnes, Chief Forensic Sorcerer for His Grace D'Isle, came the rest of the way into the room. He stood perhaps a hair under six feet, and was massive, not fat. He had been wrestling champion for Oxford University in 1953 and '54, and had kept himself in trim ever since.

"I didn't know if anyone connected with this office would be welcome," he said. "I'm frightfully sorry about all this, Master Sean."

"Come, come," said Master Sean. "Not your fault, my dear fellow. How has your gas poisoning case come out so far?"

"The Duvals? Sad case. Two brothers and their wives having a little party. Got a little drunk out, I'm afraid. The two men brought a keg of beer up from the cellar at one point, banged it against a gas line. Cracked the line. The servants had all been told off to go to the other wing and leave them alone, you see. By the time they had drunk a good part of the keg, plus assorted other inebriating beverages, the room was full of gas. They were too blotto to notice. By the time the servants smelled the gas and took alarm, it was too late. We're bringing in the bodies for autopsies to clinch the evidence, so Dr. Ambro will have more work to do, but there's really no question about what happened. Death due to misadventure." His smile came back. "How's your case doing?"

"Master Sean told him, then added: "But I wish you wouldn't call it *my* case. Your Sergeant Cougair can have it."

"That consummate ass!" Master Sir Aubrey said with a scowl. "Well, well, what's done is done. The thing to do is for us to find out who did it and clear the thing up. I wish Lord Varney were here; our Chief Investigator's the man for this sort of thing. Unfortunately, he's laid up in hospital, as I told you earlier today."

Master Sean nodded. "Aye. How's he coming, by the bye?"

"Well as could be expected. He's a good investigator, but I don't think I'll go mountain climbing when I'm his age."

"No, nor I," Master Sean agreed. "Not even at my age. The African elephants may have crossed the Alps with Hannibal, but Irish elephants like meself stay on level ground."

Master Sir Aubrey chuckled. "And English elephants the same."

"Elephants?" said a voice from the door. "What is it that the elephants have to do with the case?"

It was Sergeant-at-Arms Cougair Chasseur.

"Nothing whatever, Sergeant," Master Sir Aubrey said coldly. "We were not discussing your case."

"No, indeed," Master Sean said smoothly. "We were discussing the case, two years ago, of the elephant theft from the Maharajah of Rajasthan in Jodhpur."

"Someone stole an elephant?" the sergeant asked in some surprise.

"Eight of them," said Master Sean. "Eight white elephants."

"My God! And how is it they were recovered?"

"They never were," Master Sean said solemnly. "They vanished utterly, without a trace."

"It seems hardly possible," Sergeant Cougair said in awe. Then his eyes narrowed and he glanced at Sir Aubrey, then back to Master Sean. "The solution is most obvious to the deductive mind. The elephants were stolen by a sorcerer. You may depend upon it."

"I wish," said Master Sir Aubrey, "that we could have assigned you the case."

"But of course," the sergeant agreed. "I dare say I should have found them easily. Elephants are very large, are they not? Not easily concealed. Well, it is of no consequence. I have a case at present to solve."

"How are you doing so far?" Master Sean asked.

"Indeed, I shall tell all," said the sergeant, "but first, is it that it is permitted that I ask the results of the autopsy? Is it that it is indeed a case of poisoning?"

"It is," said Master Sean, and proceeded to give the results of his labors.

Sergeant Cougair scowled. "Then it is indeed murder. No bottle or paper or box that could have contained the poison has been found. It has disappeared as if by—" His narrowed eyes glanced covertly at Master Sean. "—as if by magic." He let his eyes relax and looked down at his hands. "It is sad that we do not know what the poison was."

"I'm working on it," said Master Sean dryly.

"Most of a certainty," the sergeant said agreeably. "Now, as I promised, I shall tell you how we have progressed ourselves.

"We have thus far found no motive whatever. The twenty-two customers who were in the establishment have been released to their businesses or homes, but forbidden to leave the city. I have a list of them here, should you care to peruse it. The two waiters and the barman we are keeping for a while, since it is apparent that it is more likely that one of them poisoned the drink than any other. Equally, we have apprehended for questioning the two waiters who were on duty before the changing of the shift at four of the clock. We are still looking for the barman; he is a bachelor and has not yet returned home.

"We have questioned the Goodman Jorj Veblin, who is the 'Son' of Veblin & Son, and he has deposed that the Senior Captain Vandermeer has appeared at his establishment every Tuesday for the past three months with a prescription from the Reverend Father Pierre St. Armand, Healer, for a week's supply of the medicine.

"We spoke to the Father Pierre, a venerable old gentleman, who deposes that the said Senior Captain Vandermeer did, indeed, suffer from the malaria, as you conjectured. He appears to have obtained this disease while serving with the Imperial Legion in the Duchy of Mechicoe, upon the northern continent of the New World, New England."

Master Sean sighed. He needed no one to tell him that Mechicoe was in New England, nor that New England was the northern continent of the western hemisphere. Next the sergeant would be explaining that the square of seven was forty-nine.

There was a short silence, broken at last by Master Sir Aubrey. "Well? What else?"

The sergeant spread his hands and shrugged. "Alas! I greatly fear me, Master Sorcerer, that that is all the information we have obtained so far."

"Who benefits by his death?" Master Sean asked.

"So far as we have determined, his wife only. He has no children of record. But there was no woman in the barroom during that time."

"She might have disguised herself," said the Irish sorcerer.

"It is possible, but we have a description of her. She is young—not yet thirty—with very long black hair, very tanned skin, and dark eyes. She is adjudged very beautiful, with a slim waist and a full figure—a *very* full figure. Such a one would be difficult to conceal; it has been a warm day, so she could not have worn a cloak without attracting attention. Still, we shall, of

course, check her every move during the afternoon. She is reported to be shopping. If so, we can find out where and at what times, do you comprehend."

"She might have paid someone to do it for her," Master Sean pointed out.

"Again, it is possible, but it has been my experience that a paid assassin does not poison his victims. The knife, the club, the pistol are his tools. Or, for some of the more clever, the accidental-seeming death. Poison is more the tool of the amateur."

Master Sean had to admit to himself that, for once, Sergeant Cougair was very likely right.

"The problem is," Sergeant Cougair continued, "that *anyone* could have done it. Distract a man's attention but for a few seconds, and the drink is poisoned. Our sole hope, I fear me much, is to find the poison container, for which we are even now searching diligently." He looked at his wristwatch. "I go now to search out the whereabouts of Cambray, the missing barman. It was, after all, he who mixed the deceased his drink, and perhaps he has information for us. With God, my sirs." And he left.

Master Sean stared at the door that had closed behind the sergeant for two full seconds before he said: "Now let me see. Cambray, the barman, poisons Vandermeer, goes off duty, drops the poison container into the Seine, takes the 4:22 to Bordeaux, and can be in Spain in the morning, safely away from extradition. But *he* may merely be able to give information, while *I* am a suspect. I admire his reasoning powers for their depth and complexity. No merely intelligent man could reason in that manner."

"I told you he was a consummate ass," said Master Sir Aubrey.

V.

Sergeant Cougair had been right about another thing: The late Senior Captain's wife was beautiful, and had a *very* lush figure. In addition, she stood no more than five feet tall. No, Master Sean thought, it would not be possible for her to go into a bar and not be noticed, no matter what she was wearing.

There was another possibility, however. Did the woman have the Talent? If so, there were several ways she could have gone into that bar without attracting attention. The Tarnhelm Effect, for one. It did not, as popularly supposed, render a person invisible; it was merely a specialized form of avoidance spell. Anyone

using the Tarnhelm Effect remained unnoticed because no one else looked in that direction; they would avoid the person with their eyes; they would look anywhere except at that person.

Mary Vandermeer had come in with three other people to identify the body: the late Senior Captain's manservant, Humfrey; the pharmacist, Jorj Veblin; and the Healer, Father Pierre. Humfrey was an old Vandermeer family retainer; he had helped bring up the child who was to become Senior Captain Andray. His old face was lined with worry wrinkles, as though the job had been far from easy.

Master Pharmacist Jorj Veblin was a competent-looking man in his early thirties, with regular, rather pleasant features and mousy brown hair which he brushed straight back and kept cut somewhat shorter than the current style.

Father Pierre looked, as the cant phrase had it, "ninety years older than Methuselah." He was taller than Master Sean, but very thin and frail-looking. His face had few wrinkles, and a benign smile, but the skin was tightly drawn over the facial bones, and the few white hairs on his skull looked like an aura in the gaslight.

One by one, separately, they were led into the room where the dead man lay. One by one, separately, they identified him as Andray Vandermeer.

Old Humfrey had tears in his eyes. "Bad, very bad. The Captain had a good many years in him yet, he did."

Goodwife Mary choked up and could say nothing but: "That's him. That's Andray."

Master Jorj looked both grim and sad. "Yes, that's Captain Andray. Poor fellow." He shook his head sadly.

Father Pierre looked long and carefully. "Yes, that's poor Andray," he said at last. Then, turning to Master Sean: "Has he been given the last rites?"

"He has not, Father," the sorcerer said. "And there is no thaumaturgical reason why he should not be given them. We have all the evidence of that kind we need."

Senior Captain Andray Vandermeer was given the last rites of Holy Mother Church. The wife, the valet, the pharmacist, and two Armsmen were present at the ceremony. Master Sean and Master Sir Aubrey were in another room, constructing a subtle trap.

Perhaps "subtle" isn't exactly the right word, but no other will quite do. In form, it was about as subtle as coming up behind a person who is pretending deafness and shouting *"Boo!"* in his ear.

But in practice, it was such that only one person would be aware that anything out of the ordinary had happened, and then only if that person possessed the Talent.

The spell itself is simple and harmless. As Master Sean had once put it to Lord Darcy: "Imagine a room full of people, each one with a different kind of noisemaker—a rattle, a drum, a horn, a ball of stiff paper to crackle, a hissing through the teeth, every sort of distracting noise you can imagine. What would you do if you had to think?"

"Put my fingers in my ears, I should imagine," Lord Darcy had replied.

"Exactly, me lord. And there's not a Talented person alive who wouldn't do the psychic equivalent of just that, if that distraction spell were cast on him. A person with little or no Talent just becomes distracted and loses his train of thought. He hasn't the least notion that it came from outside his own mind. A person with a good, but untrained Talent will recognize the spell for what it is, but won't know what to do about it. A Person with a trained Talent will block it instantly."

"Can't the response be feigned?" his lordship had asked.

"It can, me lord, but only after the initial blocking. In order to think out a lie, a false reaction, you need at least a fraction of a second of peace. Which you can't get without putting up the block, d'ye see."

"How could that be detected by a sorcerer who's putting out all that mind noise?" Lord Darcy had wanted to know.

"He couldn't," Master Sean had explained. "That's why it takes two to spring the trap. One to say *Boo!* and the other to see if the victim jumps."

This time, Master Sir Aubrey would cast the quick-shock spell, and Master Sean would watch the victim.

"Fat lot of good it did us," Master Sir Aubrey said half an hour later. "I noticed no reaction from any of the three." They had not tested Father Pierre; there was no question about a Healer having the Talent.

"Master Jorj and Goodman Humfrey haven't got a trace of the Talent," Master Sean said. "The young woman has a definite touch of it, but it's undisciplined and untrained. If there's any magic involved in this killing, we haven't uncovered it, and we haven't found a magician, either."

Master Sir Aubrey looked at the wall clock. "Fifteen of nine. You should have been in Rouen by now."

Master Sean scowled. "And now I can just twiddle my thumbs. There's nothing left for me to do. Except think. I wish I could remember what there is about that poison. . . ."

"See here, old friend," said Master Sir Aubrey, running a palm over his smooth pate, "we've got a room upstairs, with bed and bath, for important visitors. You are a visitor, and you are the Chief Forensic Sorcerer for Normandy. You are, *ergo et ipso facto,* qualified to use that room. A good shower will make you feel better. Or have a tub, if you like."

"My dear Sir Aubrey," said Master Sean with a smile wreathing his face, "you have made yourself a deal. Let's see this room."

The big sorcerer led him up a flight of stairs to a narrow corridor on the upper storey. He took a key from his key ring and unlocked a door.

The room was small, but comfortable, like those of a good country inn, with the added attraction of an adjoining bath.

"I couldn't ask for better," Master Sean said. "Fortunately, I always carry a change of underclothes in me carpetbag."

He put his symbol-decorated carpetbag on the bed, opened it, and rummaged around until he came up with the underclothes. "Socks? Socks? Ah, yes, here they are."

Master Sir Aubrey was looking at the bag, using more senses than just his eyes. "Interesting anti-tampering spell you've got on your bag," he said. "Don't think I've ever come across one with quite those frequencies and textures. What's the effect, if I may ask? I detect the paralysis component, but . . . hmmm . . ."

"A little invention of me own," said Master Sean, a bit smugly. "Anybody opens it but meself, he immediately closes it again, then sits down next to it and does nothing. He's in a semi-paralytic trance, d'ye see. If anybody else comes along before I get there, the man who tried to open me bag will jump up and down and gibber like a monkey. That attracts attention. Anyone seeing a fellow behave like that in the vicinity of a sorcerer's bag will know immediately there's something wrong."

Master Sir Aubrey laughed. "I *like* it! I won't ask you for the specs on the spell; I'll try to work out one of my own."

"Be glad to give 'em to you," Master Sean said.

"No, no; more fun to work it out myself."

"Whatever you say. Look, I'll freshen meself up, and I'll see you in, say, half an hour. Is there somewhere we can get a bite to eat? I haven't had a morsel since noon."

"Do you like German food?"

"With German beer?"

"With German beer."

"Love it."

"Good," said Master Sir Aubrey. "I know a fine place. I'll be waiting downstairs. Here's the key to this room. You can leave your bag here, if you like. Just shove it under the bed and lock the door. I'll post notice that the room is yours, and nobody but a fool would disturb it."

"Right," said Master Sean. "I'll see you at—say, twenty past nine?"

VI.

The *Kölnerschnitzel* at Hochstetter's was delicious, and the Westphalian beer was cool and tangy. In fact, the beer was so good that, after packing away the *Kölnerschnitzel,* the two magicians had another stein.

"Ahhh!" said Master Sean, patting himself three inches below his solar plexus. "That's just what I needed. I feel so good that I'm not even angry with Sergeant Cougair any more."

"Speaking of whom," said Master Sir Aubrey, "the sergeant came into the office while you were bathing. I didn't want to bother you with anything until you'd eaten."

"Oh? Is it something that should bother me?" Master Sean asked.

"Not particularly. More data. I just didn't want you to be trying to piece everything together until you had a cold beer in your hand and enough fuel inside you to power your brain."

"I see. What was it?"

"He finally found the barman who went off duty at four this afternoon. Fellow named Cambray. He knew the deceased by sight and name. Seems the Captain came in every week, had a few drinks and left."

Master Sean nodded. "I see. Came in every week to get his prescription filled and then had a few snorts at the bar before going home."

"Precisely. Regular as clockwork, it seems. Now, here's the peculiar thing: he always ordered the same drink, which is not peculiar in itself, but what he drank was a Mechicain liqueur called *Popocotapetl.* It's not much called for, and it's rather expen-

sive, since it's imported from across the Atlantic."

Master Sean nodded. "I've tasted it. A former pupil of mine, Master Lord John Quetzal, gave me a few drinks from a bottle his father, the Duke of Mechicoe sent him. It's a semi-sweet liqueur made from some cactus, I think."

"This wasn't semi-sweet," said Master Sir Aubrey.

"No?"

"No. Sergeant Cougair impounded the bottle—the only bottle they had, by the way—and tasted it, the idiot. He reports that the drop on his fingertip was as bitter as potash."

Suddenly several things came together in Master Sean's mind. "*Coyotl* weed!" he snapped.

The other sorcerer blinked. "What?"

"*Coyotl* weed," the Irish sorcerer said more calmly. "I was told about it by Lord John Quetzal while he was studying forensic sorcery under me. It's an alkaloid extract of the weed, actually. Been used as a poison in Mechicoe for centuries. Lord John Quetzal said it has no pharmaceutical uses, at all. I doubt if we could get a sample of the stuff to do a similarity analysis with. The Mechicains used to use it for poisoning rats, but since they've got trained sorcerers now to handle that problem, the stuff has been declared illegal except for research purposes. So someone put it in the bottle of *Popocotapetl,* eh?"

"Yes, and that makes the whole case crazier than ever," Master Sir Aubrey said. "It could have been put in there at *any* time previous to the murder—days before, even. And it would have killed anybody who drank it. *Anybody,* not just Captain Andray Vandermeer."

Master Sean said: "We might be dealing with a psychotic individual. Or, possibly, someone who wants to ruin the reputation of the International Bar on the Cosmopolitain Hotel. Your Sergeant Cougair has his work cut out for him."

"Oh, the sergeant has his theories," Master Sir Aubrey said dryly. "You see, since the barmen and waiters all agree that nobody came behind the bar except for themselves, then whoever put the poison in the bottle must have been invisible. According to the sergeant, I mean. And that means a sorcerer, and that means you."

"*Me?*" Master Sean managed to keep his voice under control—barely.

" 'Least Likely Person Theory,' he calls it," the big magician continued. "But I think it's more than that. This case really has

him baffled. He can't understand what happened—can't see how the trick was done. The more data he comes up with, the more mysterious it gets, and the more confused *he* gets. Not his type of case, really."

"What *is* his type of case?" Master Sean asked. "Nursery riddles?"

"No." Master Sir Aubrey chuckled. "Nothing that complicated. Street killings, bar killings, brawls, that sort of thing. The knife drawn in anger, the sudden smash of a club. Such things are usually pretty much open-and-shut. But this one is beyond his mental equipment. And instead of admitting it, he's trying to bull it through. If it weren't for your presence there, he'd probably have already rushed off and arrested the widow as the *most* likely suspect."

"What's my presence got to do with it?" Master Sean said irritatedly.

"To him," said the English sorcerer, "if there's no obvious answer at hand, then there's sorcery afoot. And you're the sorcerer. He still can't find that bottle of poison, and he thinks you magicked it away somehow."

With great care, Master Sean lifted his beerstein and drained it slowly without stopping. He put it down. "I will not," he said calmly, "let that blithering jackass upset me digestion. Let's get back to the station and see what new developments have come about, if any."

They paid their bill and strolled leisurely the quarter-mile back to the Armsmen's station, discussing several subjects that had nothing to do with the murder case.

It was twenty-five of eleven when they went into Master Sir Aubrey's office.

Lord Darcy was waiting for them.

VII.

Lord Darcy, Chief Investigator for His Royal Highness, Richard, Duke of Normandy, looked up from the book he was reading and took his pipe from his mouth. "I trust you gentlemen had a good meal," he said in a mild voice.

"Me lord!" Master Sean's voice showed a touch of surprise. "When did you get in?"

"Fifteen minutes ago, my dear Sean," said Lord Darcy, with a

wry smile on his handsome face. "When you informed me that the Parisian authorities had you in open arrest, I took the next train east. We have to have that evidence on the Zellerman-Blair case in court on the morrow. How are you, Master Sir Aubrey?"

"As well as could be expected, my lord. And you?"

"Well, but impatient. Whom do I see to get Master Sean released on his own recognizance?"

"Justice Duprey keeps late hours. When he hears Master Sean's side of the case, against Sergeant Cougair's, he'll release Sean on the instant. But *you'll* have to bring the motion; *I* can't, naturally, since I'd be going against the . . ."

"I understand," Lord Darcy cut in. "Nor could Master Sean without representation. Very well; we'll have this Cougair and Master Sean up before the Justice as soon as possible. The problem is that nobody around here has seen Sergeant Cougair for the past hour, and nobody seems to know where he is. Naturally, he'll have to appear to tell his side of the story or the Justice won't hear it."

"Oh, I'm sure he's around somewhere," Master Sir Aubrey said. "Wait a little. When's your train back to Rouen?"

"There's a slow one at two-five," Lord Darcy said. "We'll have to be on it. The express doesn't leave until five-twenty, and it will get us in very late for a six o'clock court.

"However, I'm sure we can make it. Would it be asking too much for you two to tell me what this farrago is all about?"

"Aye," said a voice from the door. " 'Tis a story Ah'd like tae be hearing', masel'!"

The tall, lean, well-muscled man in the doorway looked rumpled. His black-and-silver uniform was neat enough, but his thick thatch of dark, curly hair looked as if it hadn't seen a comb for weeks, his firm, dimpled jaw was bluely unshaven, and his deep-set, piercing blue eyes looked rather bloodshot beneath their shaggy brows.

All three of the men in the room immediately recognized Darryl Mac Robert, Chief Master-at-Arms for the City of Paris. They gave him a ragged chorus of: "Good evening, Chief Darryl."

Chief Darryl grinned but shook his head. "Nae; 'tisna that. Ah was oop a' the nicht last nicht wi' the Pemberton robbery; nae sleep this mornin' because o' the Neinboller swindlin' case; oop a' the afternoon wi' the Duval gassing. Ah try tae get soom sleep o' the evenin', and Ah find that a routine death in a bar has snowballed as if it were rollin' down the Matterhorn. Nae, lads, 'tis nae

a guid evenin'. But 'tis guid tae see yer lairdship."

"I quite sympathize with you," said Lord Darcy. "Well, do come in and sit down, my dear Chief. Master Sean, would you begin at the beginning and proceed therefrom to the present?"

"Glad to, me lord."

The telling of it took nearly three quarters of an hour, but every detail, every nuance had been told when Master Sean was through. When it was over, Lord Darcy thoughtfully smoked his pipe in silence. Chief Darryl looked grim. "It looks," he said, "as if we hae us a madman loose i' the City."

Lord Darcy took his pipestem from his mouth. "I disagree, Chief Darryl. This was a carefully planned and carefully executed murder aimed solely at one man: Senior Captain Andray Vandermeer."

"D'ye ken who did it, then?"

"The evidence we have all points in one direction. If my theory is correct, we only need a little more data, and the thing will be quite clear."

"Then let's *get* it, mon! Ah need the sleep!"

"Well, it's hardly my place to tell your Sergeant Cougair how to conduct his own case," Lord Darcy replied carefully.

"As o' this moment, Ah'm takin' charge o' the case masel'," Chief Darryl said firmly. He looked at Master Sean. "And ye'll nae have to take Chasseur before the Justice. He'll drop the charges."

"I'm afraid, however," Lord Darcy said, "that we shall have to trouble the Justice after all. We need two search warrants."

"Ah'll get 'em. For what places?"

"One for the residence of the late Captain Andray, and another for the pharmacy of Veblin & Son."

Chief Darryl was making notes on a pad he had taken from his uniform belt. "Wha' are we tae search for, yer lairdship?"

"A bottle of *Popocotapetl* that hasn't been opened, and a bottle of poison that has."

Chief Darryl murmured to himself as he wrote. "Liqueur at Andray's home. Poison at pharmacy."

"No, no!" his lordship said sharply. "There will undoubtedly be a few bottles of the liqueur at Andray's home, and there are poisons galore in any pharmacy. No, it's the other way round; liqueur at pharmacy, poison at Andray's."

"Verra well, me laird. Anything else?"

"Find out who sold the *Popocotapetl* to the International Bar,

and pick him up. I want the man who made the delivery, not the merchant, unless they are one and the same."

"Och, aye. Anything else?"

"One more thing. Bring in Mary Vandermeer, Jorj Veblin, and, following Sergeant Cougair's theory of the Least Likely Suspect, I fear you must bring in Father Pierre."

"Surely *he* couldn't have had anything to do with this murder, me lord!" Master Sean said in astonishment.

"I assure you, my dear Sean," Lord Darcy said solemnly, "that without Father Pierre's Talent, this murder could never have happened—at least, not in this way."

"Ah'll get some men on it," Chief Darryl said heavily.

VIII.

Midnight. Three men stood in the thaumaturgical laboratory at Armsmen's Headquarters.

Chief Darryl put two bottles on the lab table. "There they are, just as ye said, yer lairdship. Item—" He picked up a pint-sized, stoppered brown glass bottle. "—a bottle found in a closet in Goodwife Mary Vandermeer's bedroom. Three-quarters empty, it is." He put it down and picked up the other, a tall quart bottle full of golden yellow liquid. "Item, a bottle of *Popocotapetl,* seal unbroken." He put it down. "And we got the woman and Veblin in holdin' cells. You wanted to see Father Pierre and the spirits man?"

"Not just yet. I want to be sure that what is in that brown bottle is what killed Vandermeer. Will you make a similarity analysis, Master Sean?"

"Aye, me lord, I'll have to go up and get me bag."

"No need," said Master Sir Aubrey, coming in through the door. He held Master Sean's symbol-decorated carpetbag in one hand. "I took the liberty of fetching it myself."

"Ah, fine. Thank you. If ye'll excuse me, gentlemen, I'll get about me work."

Lord Darcy and Master Sir Aubrey followed Chief Darryl out of the lab, down the hall, and into the Chief's office.

"Sit ye doon, gentle sirs," he said with a wave toward a couple of chairs. He planted himself firmly behind his desk. "Ah'd like tae know, ma laird, why ye eliminated the barmen as suspects, if ye dinna mind."

"Because the bottle itself was poisoned," Lord Darcy said promptly. "If a barman wants to poison a customer, he can put the stuff in just one drink. He wouldn't have to poison a whole bottle of good liquor."

"But suppose he were a madman who didn't care who he killed?" Master Sir Aubrey asked. "If he wanted to kill a lot of people, wouldn't poisoning the bottle be easiest?"

"Possibly. But in that case, he'd poison a bottle of brandy or ouiskie, something that was called for regularly, not a rare liqueur that's little called for and very expensive. And certainly he would have chosen another poison than the *coyotl* weed extract. No, that poison was intended for Vandermeer and none other. He was the only customer they had who drank *Popocotapetl.*"

"But, ma laird," the Chief objected, "anyone could ha' coom intae the International and ordered the stuff. Some Mechicain micht hae come in, for instance."

"True," Lord Darcy said, "but he would be in very little danger of being poisoned. Consider: one usually sips a semi-sweet liqueur, especially an expensive one. One doesn't just knock it back against the tonsils as if it were cheap apple brandy. One sip of that stuff, and the customer would spit it out and complain loudly to the barman. It's a very bitter substance."

There was a pause. Suddenly, Master Sir Aubrey said: "Then why, in God's name, did *Vandermeer* drink it?"

"Aha! That's precisely the question I asked myself," said Lord Darcy. "Why should—"

He was interrupted by the entrance of Master Sean. "No doubt about it, me laird," he said firmly, "that's the stuff that killed the Captain."

"Excellent. We progress. Chief Darryl, will you have one of your men bring in Father Pierre?"

Father Pierre, looking benign but somewhat puzzled, was led in by a uniformed Armsman a minute later. Chief Darryl said: "Ah'm sorry to have inconvenienced ye, Reverend Sir, but we hae a most heinous crime tae clear oop."

"Oh, that's all right, I assure you, Chief Darryl," the old priest said. "I am happy to be of any assistance that I may."

Master Sean was mildly pleased to hear that the priest's Parisian accent had been smoothed and made less harsh by time, travel, and education.

"Verra well, Reverend Sir. Ah thank ye. Lord Darcy here would like tae ask ye a question or two."

"Of course." Father Pierre turned his soft eyes on the Chief Investigator. "What is it, my lord?"

"You were treating the late Captain Andray for malaria, I believe, Father?" Lord Darcy asked.

"Yes, I was, my lord."

"Do you know where he contracted the disease?"

"In Mechicoe, while he was serving with the Imperial Legion."

"And you were treating him with a herbal prescription?"

"Yes, my lord. Tincture of Cinchona. It is a specific for the disease."

"How did you get him to take it regularly, Father? It's a rather bitter drug, is it not?"

"Oh, yes. Very bitter." The priest glanced at Master Sean and Master Sir Aubrey. "You sorcerers are acquainted with the spell, I am sure. It's a matter of shifting modes of sensory perception."

"Aye," said Master Sean. "I was talking to a man a few hours ago who had had his sense of smell subtly altered so that an otherwise nauseous smell would smell sweet to him."

"Just so." Father Pierre looked back at Lord Darcy. "I cast a similar spell over the Captain, so that the bitterness would register as sweetness, you see. Mixed with a little lemon juice and water, a spoonful of the tincture became quite a pleasant drink—to him."

"Would that apply to just the tincture, or to anything bitter?" Lord Darcy asked.

"Oh, anything that was bitter would taste sweet to him. No getting around that. I'd warned him of it. He was not to accept anything as being sweet unless he knew for a fact that it *was* sweet, unless he knew that it actually contained sugar or honey. He was a very careful man, was Captain Andray."

"A lesson one learns in the Legion," murmured Lord Darcy. "Thank you very much, Father. I think that's all for now. Thank you again."

When the Healer had gone, Lord Darcy looked at the others. "You see? Of all the many people who might have come into that bar and ordered *Popocotapetl,* only Captain Andray Vandermeer would have sat there and quietly sipped that bitter potion without raising a fuss. He knew the liqueur was supposed to be sweet, and never noticed the *coyotl* extract."

"But why use a bitter poison like that?" Chief Darryl asked. "Wouldna it ha' been easier to use something more palatable?"

Lord Darcy shook his head. "That poison has one very impor-

tant quality. Master Sean, you said it was used as a rat poison. Why?"

"Because it's painless," Master Sean said. "It puts the victim quietly to sleep before it kills. Rats are pretty smart creatures; if they know a bait is poisoned, they'll avoid it, and they know if it kills a few friends in agony. For some reason, the bitter taste don't bother 'em if the stuff is mixed with bran and a goodly dollop of sugar-cane syrup."

"And how did the poison get i' the bottle i' the first place?" the Chief Master-at-Arms asked.

"That worried me, too, for a few moments," Lord Darcy admitted. "How could an unauthorized person get behind the bar, poison a bottle of expensive liqueur, and leave, without being seen? The International never closes, so it couldn't have been a burglary job. Obviously, then, the bottle, when it was brought into the bar, *was already poisoned!*" He waited while they absorbed that, then said, "Chief, will you have the liquor man brought in?"

The man who delivered potable spirits to the International Bar was a rotund, red-faced man named Baker who looked as though he smiled a lot when he was not caught up in the hands of the law.

"Master Sean," Lord Darcy whispered to the sorcerer, "would you go fetch that bottle of *Popocotapetl?*"

Master Sean nodded and left without a word.

Again Chief Darryl went through the preliminaries and then turned the questioning over to Lord Darcy.

"Goodman Baker," his lordship began, "I understand you make deliveries of spirits regularly to the Cosmopolitain Hotel."

"That I do, my lord." Baker spoke Anglo-French with as pronounced an English accent as Lord Darcy did, but it was pure middle-class London.

"To what other establishments do you deliver besides the International Bar?"

"Well, my lord, of the usual drinkin' spirits, that's the only place."

"You say 'the usual drinking spirits.' What other kind do you deal in?"

"Well, there's the high-proof clear spirits, what I delivers to the pharmacy of Veblin & Son. They uses 'em to make medicines, d'yer see. And they also takes the special medicinal brandy."

"I thought as much. Now, I want you to think hard—*very*

hard—about my next question. Did anyone at Veblin & Son order anything out of the ordinary in the past few months?"

"Don't have to think too hard on that one, yer lordship," Baker said with a self-satisfied air. "He bought—young Master Jorj, that is—he bought a quart of that Mechicain stuff, the Popey-cotty-petal. Very dear it is, yer lordship, and as we being the only importers of it in Paris, I remembered his buying of it."

"And when was this?" Lord Darcy asked.

"Four weeks ago Friday last."

"And when was the last time you made a delivery to Veblin & Son?"

"Friday last."

"How very gratifying," Lord Darcy murmured with a pleased smile. "And did you deliver a bottle of *Popocotapetl* to the International Bar on that day?"

"I did, my lord. I suppose they told you that."

"As a matter of fact, they did not. I deduced it. I shall make a further deduction: that you always and invariably make your deliveries to Veblin & Son *before* you make your deliveries to the International."

"Why, that's true as Gospel, my lord! I always park my delivery wagon to the rear of the hotel and my helper holds the horses while I takes the deliveries in on a hand cart. From the rear door, the first place you comes to is the pharmacy, so I makes my delivery there first."

"Bringing your hand cart in with you, I presume?"

"Oh, indeed, my lord. Leave it out in the corridor, and likely there'd be a bottle or two missing when I came out."

"And you carry the delivery into the rear of the pharmacy, leaving the hand cart in the front room?"

"I do. Master Jorj keeps an eye on it for me. He'd not steal from it himself, nor let anyone else do so."

"I dare say not," Lord Darcy agreed. "Then you go on to the International and deliver their orders."

"I do, my lord."

By this time, Master Sean had returned with the bottle of *Popocotapetl*. Lord Darcy extended a hand, and the little Irish sorcerer handed him the bottle. Lord Darcy put it on the desk in front of Baker. "Is this the bottle you sold to Master Jorj Verblin four weeks ago Friday last?"

Baker looked at the bottle. "Well, now, I couldn't swear as to that, my lord. Them bottles are all pretty much alike, and . . ."

Suddenly he picked up the bottle and looked more closely at it. "Wait a minute, my Lord. This ain't the bottle I sold him."

"How do you know?"

Baker pointed at some small figures written on the label. "The date's wrong, my Lord. This is from the shipment we received from Mechicoe two weeks ago."

"That's a stroke of luck!" said Lord Darcy. "Master Sean, bring in the bottle we found in the bar."

Master Sean returned within a minute, bearing the poisoned bottle. Lord Darcy took it, and without letting it out of his hands, showed the label to Baker. "What about this bottle?"

"Well now, I can't positively identify it as being the one I sold to Master Jorj, but it's got the proper date on it."

"Very well. Thank you very much for your help. Goodman. You may go home now."

When Baker had gone, Lord Darcy picked up his pipe and lighter, and puffed the pipe alight before speaking. "And there you have it, gentlemen. I daresay, Chief Darryl, that a little probing into the activities of Mary Vandermeer and Jorj Veblin over the past several months will reveal a greater intimacy between them than has heretofore been suspected. Vandermeer was much older than his wife, and it may be that she decided to dispose of him in favor of a younger man—Veblin, to be exact. If the Captain was like most Legion officers, he left her a small, but comfortable, fortune."

I'm afraid I don't quite see the whole picture," said Master Sir Aubrey. "Exactly what happened?"

"Very well. Some years ago Captain Andray married his present wife—rather, widow—who was a woman of Mechicain descent. He probably married her over there. At any rate, he brought her with him when he retired. And she brought with her a bottle of *coyotl* extract. We can't be certain why, at this time; perhaps she was planning his murder even then.

"Exactly how she met Veblin, and how they made their arrangements, is something you'll have to get your men to dig out, Chief Darryl, but that's routine legwork."

"But how did ye know 'twas them?"

"Who else knew that he was under a Healer's spell that would make bitter things taste sweet? He undoubtedly told his wife, and the pharmacist would certainly guess it.

"At any rate, she gave Veblin the poison. She knew of the Captain's taste for *Popocotapetl,* and so informed Veblin. Veblin

thereupon bought a bottle of the stuff, laced it with poison, and waited until Baker delivered a fresh bottle to the International Bar. Then, while Baker was unloading the medicinal spirits in the back room, Veblin switched bottles so that the poisoned bottle was delivered to the bar. Then it was simply a matter of waiting until the following Tuesday—today—" he glanced at the clock. "Yesterday," he corrected himself, "the Captain comes in, orders his drink as usual, and that's that."

"But why did he keep the good bottle after the switch?" Master Sean asked. "Why not get rid of it?"

"Because he knew that eventually the investigators would find the poison in the bottle and check with the importers. They would inform us, as they did, that he had bought a bottle. It was his intention to say, 'Oh, yes, I did, and I still have it.' He didn't know that importers of spirits put the date on the goods when they are received."

"It seems tae me," said Chief Darryl, "that a pharmacist would have plenty of poisons on hand withoot havin' tae use a special import frae Mechicoe."

"That's just the point," said Lord Darcy. "If he had used any of the normal pharmaceuticals, any competent forensic sorcerer could have identified whatever poison he used, which would increase his chances of being found out. He was hoping that there wouldn't be a man in Europe who could identify *coyotl* extract. Any other questions?"

Chief Darryl thought for a moment, then shook his head. "That aboot covers it, ma laird. Since we know how it was done and who did it, the rest is simple." He looked up at the clock at the wall. "Where the De'il is Sergeant Cougair? Ah hae a few words to say to that wee mon."

"Why, as to that," Master Sir Aubrey said, almost offhandedly, "the last time I saw him was in the upstairs bedroom."

Chief Darryl shot to his feet. "What the Hell is he doin' oop there?"

"Sitting. Just sitting."

"Armsman Stefan!" bellowed the Chief Master-at-Arms. The door to the corridor popped open, and a Man-at-Arms stuck his head in.

"But yes, my Chief?"

"Go oop the stair tae the visitor's bedroom and fetch me Sergeant Cougair Chasseur."

"But yes, my Chief!" The door closed.

Master Sean looked at Master Sir Aubrey. Master Sir Aubrey looked at the ceiling. Lord Darcy looked puzzled.

Man-at-Arms Stefan returned. It was obvious from the contortions of his face that he was attempting to control a giggle. "My Chief, it is apparent that the Sergeant Cougair has taken leave of his senses. When one speaks to him, he leaps up and down and gibbers like the monkey."

"He does?" Chief Darryl headed toward the door. "We'll see aboot this. Coom wi' me!"

In half a minute, there were loud voices and laughter coming down the stairwell.

Master Sean sighed and opened his carpetbag. He took from it a small four-inch wand made from a twig of the hyssop plant. "I'll go up and remove the spell," he said. "You didn't by any chance tell him the poison bottle was in me carpetbag, did you, Master Sir Aubrey?"

"Of course not," the sorcerer said indignantly. "Quite the contrary. I absolutely forbade him to look there at all."

Master Sean left. Lord Darcy said nothing; he had the Zellerman-Blair case to worry about, and he had no wish to meddle in the affairs of wizards.

THE SF CONVENTIONAL CALENDAR
by Erwin S. Strauss

By now, I hope most of you have been to at least one SF con. Next time, invite a friend along.

The phone numbers in the listings below are the fastest way to find out more about a con you're interested in — and, during off-peak hours, sometimes cheaper than mailing a stamped reply envelope. Avoid phoning 1) late at night and 2) collect.

For more information on these and other cons, feel free to call me at (301) 794-7718, between 10 AM and 10 PM. For a longer, later list of cons, and a sample of SF folksongs, send me a stamped, addressed envelope at 10015 Greenbelt Road #101, Seabrook MD 20801.

BuboniCon 10, August 25–27, 1978, Albuquerque NM. Guest of Honor: Gordon R. Dickson. A good warmup for WorldCon. **(505) 821–3953**

IguanaCon, August 30–Sept. 4, Phoenix AZ. HQ at the Adams Hotel. The 36th World SF Convention. $25 to join. Guest of Honor: Harlan Ellison. Hugo awards presentation. This is the biggie.

Fantasy Faire 8, Sept. 22–24, Los Angeles CA. $7.50. **(213) 337–7947**

PghLANGE 10, Sept. 29–Oct. 1, Pittsburgh PA. Guest of Honor: Rick Sternbach. Favorite place to rest from WorldCon. **(412) 561–3037**

NonCon, Oct. 7–9, Edmonton, Alberta, Canada. A rare opportunity for Northern Plains fans on both sides of the border. Guests of Honour: Marion Zimmer Bradley and Grant Canfield. **(403) 469–0719**

RoVaCon, Oct. 6–7, Roanoke VA. Guest of Honor: Freas. **(703) 389–9400**

MapleCon, Oct. 13–15, Ottawa, Ontario, Canada. Guest of Honour: Hal Clement. Have Hal do the Welsh anthem — in Welsh. **(613) 836–1218**

4th World Fantasy Con, Oct. 13–15, Ft. Worth TX. Honoring Texas's own R. E. Howard. With Fritz Leiber & Gahan Wilson. **(817) 261–9818**

OctoCon 2, Oct. 14–15, Santa Rosa CA. Repeat of the surprise smash con of last year, filling a long void on the West Coast. Guest of Honor: Frank Herbert. Also: Poul Anderson. **(707) 544–5959**

PhilCon '78, Dec. 8–10, Philadelphia PA. The oldest established SF con in the world. Write: **210 Londonderry Lane, Darby PA 19023**

ChattaCon 4, Jan. 5–7, 1979, Chattanooga TN. Foster. **(615) 892–5127**

Boskone 16, Feb. 16–18, Boston MA. **Box G, MIT Station, Cambridge MA 02139**

CoastCon '79, March 9–11, Biloxi MS. G. R. R. Martin. **(601) 436–3482**

WesterCon 32, July 4th weekend, San Francisco CA. The traditional West Coast con. Lupoff. Write: **195 Alhambra #9, SF CA 94123**

SeaCon '79, August 23–27, Brighton, England. 37th World SF Con. Guests of Honour: Fritz Leiber and Brian Aldiss. $15 in 1978. $7.50 supporting includes Hugo voting rights. **(518) 783–7673**

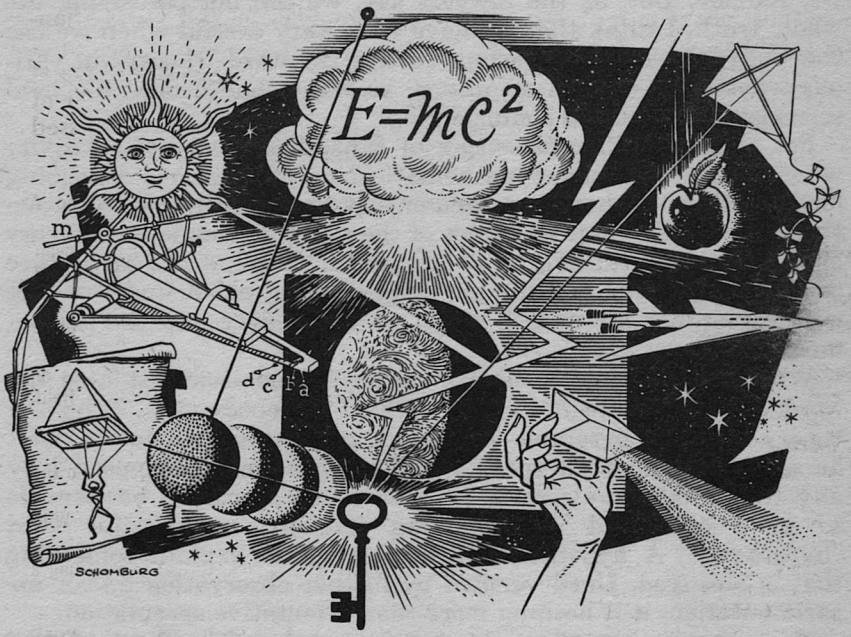
NorthAmeriCon, Aug. 30–Sept. 3, '79, Louisville KY. Continental con, while the WorldCon is in England. $10 till Sept. 30, '78. Guests of Honor: Fred Pohl, and some guy named Scithers. **(502) 636–5340**

NovaCon 9 (West), Nov. 2–4, 1979, Albany NY. Guests of Honor: Bob (Bosh) Shaw and Wilson Arthur (Bhob) Tucker. **(518) 783–7673**

ON THEORIES & EXPERIMENTS

by Milton A. Rothman

art: Alex Schomburg



Dr. Rothman's current project is the peculiar behavior of photons, which, under certain circumstances, appear to act as if they were in two places at the very same time. We hope to see details on this project sometime in the future. Meanwhile—

A reader recently took me to task for the conservative tone of an article previously published among these pages. His complaint apparently concerned my skepticism regarding such matters as ESP and faster-than-light travel. Isaac Asimov, gallantly coming to my rescue, made the reply that "... Rothman is talking about the conclusions of well-established and basic theory."

True enough. Never would I argue with my esteemed friend Dr. Asimov. But, as the lawyers say, we are not perceiving the whole truth. I think that we have to be very careful when we use the word "theory." Even scientists use the word "theory" in various ways with various meanings, so what chance does the non-scientist have to avoid confusion?

For example, when we speak of Einstein's theory of relativity we mean a very abstract mathematical set of equations describing how things move, how mass and energy are related, and so on. On the other hand, when we speak of the kinetic or molecular theory of gases, we are talking about a physical model, a mental picture of a gas consisting of little particles dashing about and colliding with each other. From this model we can deduce how the gas behaves.

Where we get into trouble is when the non-scientist uses the word "theory" to mean a *speculation*. If somebody says, "I have a theory that the pyramids were built by extraterrestrial beings," he is talking about a speculation or conjecture unsupported by any kind of factual evidence. Now scientists speculate, but they do so in a controlled way, making frequent use of the word "hypothesis." A hypothesis is an attempt to explain something that is observed. Until verified by further observation and/or experimentation, it is nothing more than a tentative speculation.

The point is this: when Dr. Asimov speaks of "well-established theory," I know that in the back of his mind he is thinking that this theory has been established by means of numerous experiments, by careful, exquisitely precise measurements, and by observation on every conceivable outcome of the theory. If no contradictions to the theory are ever observed, then we can say that the theory is well-established.

Without this understanding, the non-scientist can simply reply, "*Oh, that's only a theory*," whenever I tell him something he doesn't like—for example that perpetual motion machines don't work, that antigravity is impossible, that you can't go faster than light, and so on.

I make a big issue of this because I happen to be an experimen-

tal physicist, but also enough of a philosopher-of-science to have written a few articles about the relation between theory and experiment. My interest in this topic became aroused when I started teaching college physics about ten years ago (after having been in research for 20 years), and I suddenly discovered that I didn't know how to teach Newton's laws of motion in a logical way. None of the textbooks seemed to deal with the subject in a completely logical manner, and I thought you should be able to deal with it the way mathematicians handle Euclidean geometry. Set down some axioms and postulates, work through a few theorems, and there you have it. It turns out to be not so simple, and in fact it turns out to be exceedingly complex. It cannot be handled the same way you would handle Euclid's geometry, because Newton's laws involve the behavior of physical objects. If the theoretician uses Newton's laws of motion to make certain predictions about how objects are going to behave, then it is up to the experimentalist to observe that behavior and see if it agrees with the predictions.

I'm not going to get into the gory details of this matter right now because it becomes very lengthy and rather tedious. (For those who are interested, the subject occupies a chapter of my book *Discovering the Natural Laws: The Experimental Basis of Physics,* Doubleday-Anchor Books, 1972. It is something every student and teacher of physics should read.)

The best experimental verification of Newton's laws—both the laws of motion and the law of gravity—is seen in the orbital motion of planets and satellites. The very fact that our spaceships and satellites work the way they are supposed to work is proof that the theory is correct. The most exquisitely sensitive test of the theory is the simple and well-known fact that objects travel in elliptical orbits around the planet or star sitting at one of the focal points of the ellipse. What is most important is that axis of the ellipse (the line drawn between the two focal points) remains fixed in space. In other words, if a satellite is orbiting the earth (and we imagine no perturbing forces from other planets and a perfectly spherical shape for the earth), then the orbit of this satellite will be like a rigid hoop retaining its shape with its long axis pointing to one part of the sky forever.

This fact is a direct result of the inverse-square nature of the law of gravity. (The gravitational force between two bodies varies inversely as the square of the distance between their centers.) If gravity deviated just the slightest from this kind of law, then or-

bits would not behave like this. The axis of the ellipse would not stay fixed in space.

Now the moon has been orbiting the earth for quite some time, and so it has been under careful observation for several centuries. After taking into account perturbations from other planets, and also the fact that the earth is shaped more like a pumpkin than a sphere, astronomers were able to show that the inverse-square law of gravity was good to better than one part of a million, as far as the earth-moon system was concerned.

However, if we go to a place where there is a stronger gravitational field, then we find visible deviation from Newton's law appearing. This can be seen in the orbit of Mercury, which does not behave properly—even after making all the corrections imaginable for the shape of the sun and the perturbations from other planets. It required an entirely new theory of gravitation—Einstein's general theory of relativity—to explain the behavior of Mercury. But the deviation of Einstein's theory from Newton's theory is only about one part in ten million at the orbit of Mercury. And the verification of Einstein's theory from observation of Mercury's orbit is good to about 1 percent!

I mention these numbers to give you a rough idea of the utterly incredible precision that can be obtained from many physical measurements. I believe that this is one of the fundamental ways in which physics differs from most other disciplines. It is the precision, accuracy, and reproducibility of the measurements that helps make it as reliable a science as it is. When I say that a measurement is good to one part in ten million, I mean that the uncertainty in the measured quantity is in the eighth significant digit! (And I scold students when they put down more than three significant digits on their lab reports, for that's the kind of accuracy we have in the General Physics lab.)

Another revelation that came to me when I started teaching was the realization that I did not know how accurately the law of conservation of energy was known. The usual textbooks cite century-old historical experiments showing that the amount of energy going into a reaction is the same as the amount of energy coming out of the reaction. Surely, I thought, there must be more recent and more accurate work. And, I thought, if I haven't heard about it there must be a lot of other people who also haven't heard. It sounded like a good idea for a book. (It often happens that when I find I don't know something, then I get the urge to write about it. In that way I learn about it. ((That's called re-

search.)) And burrowing around in the depths of the Princeton University Library can be fairly mind-blowing.)

Indeed it turned out that conservation of energy has been exceedingly well verified. You might think that with all the different kinds of energies and all the different kinds of reactions possible, you would have to perform an infinite number of experiments to verify this law in all its ramifications. However, it turns out that there are only a very few different kinds of energies—probably no more than four, and possibly as few as one. These energies are related to the four fundamental kinds of forces: the gravitational, the electromagnetic, the strong nuclear, and the weak nuclear. Recent work is beginning to unravel the relationships among these four forces, and it appears that perhaps they can be all hung together as facets of a single force called "supergravity."

But regardless of the exact number of elementary forces, if we find that energy is conserved in reactions among elementary particles, then of course energy will be conserved on all levels, for everything is made of these particles. There is one particular kind of nuclear reaction that makes an exceedingly fine probe of energy transitions in atomic nuclei. When gamma ray photons enter a nucleus they can be absorbed, raising the nucleus up to a higher energy level. This is likely to happen only if the photon has exactly the right amount of energy. Photons of the right energy can be obtained from certain radioactive sources. For example, radioactive Co^{57} changes into Fe^{57}, giving off a photon with an energy of 14.4 thousand electron-volts (keV). If these photons are passed through an absorber of Fe^{57}, they will be strongly absorbed by the process of resonance absorption described above, because they have exactly the right amount of energy to raise the Fe^{57} nuclei up to a higher energy level.

However, a small motion of the source, changing the photon energy by the Doppler shift process, will destroy the resonance and reduce the amount of absorption. This technique, called the Mössbauer effect, is probably the most precise detector of energy levels known. What it does is compare the photon energy with the energy inside the nucleus. In the most precise experiments, these energies are found equal to within one part out of 10^{15}. There was talk of another experiment getting down to one part in 10^{17}, but I have not seen the outcome of that experiment.

In these experiments the energy under investigation involves both the nuclear force and the electromagnetic force, since the

position of the energy level in the nucleus is determined partially by the nuclear force, while the emission and absorption of the photon is mediated by the electromagnetic force.

If you think that precisions of one part in 10^{15} are mind-boggling, I have a better one for you. Perhaps the most precise experiment on record is the one showing that the electron and proton have the same amount of electric charge. If there is any unbalance between these two charges, the experiments show that the inequality must be less than 1 part out of 10^{20}. A number of that nature can be obtained only because it is relatively easy to measure very tiny quantities of electric charge, and the experiment itself is moderately simple.

When I first heard of this experiment I thought to myself: don't all the textbooks take it for granted that the electron and proton have equal amounts of electric charge? Isn't that why atoms are electrically neutral? But that's the catch. We mustn't take anything for granted! What would happen if atoms were not precisely electrically neutral? Suppose they were all positively (or negatively) charged by a very small amount—say 10^{-18} of an electron charge. This unbalance would not be big enough to notice under ordinary conditions, but astrophysicists R.A. Lyttleton and Hermann Bondi suggested that such a minute deviation from neutrality would be enough to account for the expansion of the universe. It would simply be the result of an electrostatic repulsion among all the atoms in space. For this reason it was important to make measurements to a precision finer than the 10^{-18} figure in order to dispose of the Lyttleton-Bondi hypothesis.

When we talk about the possibility or impossibility of ships traveling faster than light we get into the subject of Einstein's special theory of relativity. The historical bits of evidence verifying this theory were the Michelson-Morley experiment (1887), the Kennedy-Thorndike experiment (1929), and the Ives-Stillwell experiment (1938). These experiments demonstrated that we could not think of light as some kind of wave in a hypothetical "ether." Motion of the earth through the ether could not be detected, and the speed of light was always found to be constant, no matter how the source or receiver was moving.

The original Michelson-Morley experiment could have detected an "ether drift" of about 1/40th the amount expected from the ether theory of light. With modern technology we should expect to do even better than that, and indeed we can. A 1964 experiment using laser light was sensitive enough to detect an "ether drift"

less than 1/1000 of the earth's orbital velocity. None was found.

Many other experiments have been performed, using lasers, masers, and the Mössbauer effect. None of these have detected an ether drift. The most accurate Mössbauer effect experiment (involving a radioactive source and absorber mounted on a rotating wheel) claimed an upper limit of 1.6 meters per second on a possible ether drift. (And the earth's speed around the sun is 30 *thousand* meters per second.)

These experiments, and many others, tell us that radiation and matter behave according to the predictions of Einstein's special theory of relativity. Thus, it is not "just a theory." It is a conceptual structure backed up by the most rigorous experimental proof.

An understanding of these precise experiments is necessary to have a real feeling for what physics is all about. Knowing theory is not enough. You have to know where the theory comes from. For those of you who are interested in obtaining more details about the above experiments and many others involving the fundamental laws of nature, you will find them in my book *Discovering the Natural Laws.*

AN EYE FOR DETAIL

by Jesse Peel

art: George Barr

Since the four stories Mr. Peel has sold us have been entirely different in mood, setting, and plot ideas, we've assigned them to four different artists. Mr. Peel, though entirely satisfied with the results, claims we're making it extra hard for him to collect original artwork that illustrates his works—such are the problems of the completist collector.

His coffee came, and he was just taking the first sip when she moved in from his blind spot and slid into the chair across from him. His sudden inhalation sucked in hot coffee along with the air, and it burned the hell out of his mouth.

"Good morning, Jack," she said, treating him to her slightly crooked, but otherwise perfect smile.

"Excuse me?" he managed to blurt through the scalding fluid. It was an automatic reaction—you never gave anything away to a subject, even if you knew they'd spotted you. It was the first rule of surveillance.

Her smile grew broader. She didn't have a pretty face. It was strong and uneven featured, and difficult to stamp a nationality to it. Her mouth was a shade too large, her thin nose had a slight bend, and her gray, gray eyes were almost black.

No, he wouldn't call it a pretty face—but it was interesting. And if he was anywhere near correct in his suspicions, it belonged to one of the most interesting people who ever lived.

"Now," she continued, "you're supposed to ask me who I am and what I'm doing here and what I'm talking about, pretending total ignorance."

"Uh, I don't think—"

"And then," she said, ignoring his interruption, "you will try and look puzzled when I accuse you of following me."

Jack felt the hair on his neck crawl with goose bumps. He definitely wasn't in control of this situation—not at all—but he tried.

"Look, lady, you've obviously gotten me—"

"—mixed up with someone else?", she finished. Her smile turned into a laugh, deep and full. "Not playing the game right, am I? Tell you what, suppose I lay out a few things, and you stop me if I make a mistake, okay?"

He nodded mutely, unable to think fast enough to say anything.

"Let's see. You are John D. Brower, owner, operator, and sole employee of Brower Investigations. You do freelance detective work for the big firms, and pick up a case or two on your own now and then. You are thirty-one years old, unmarried, weigh 79 kilos, stand 183 cm. tall in your gumshoes, and you have a medium-sized brown mole on your left buttock.

"Shall I go on?"

Well, damn. It was burned, and he had problems, no doubt about it. He tried a grin, failed, and looked down into his coffee as if an answer might be floating there.

It wasn't.

"That should convince you I know what I'm talking about." She leaned forward, over the small table, and unconsciously, he duplicated her gesture.

"I have one question, though. *Why* are you following me?"

He took a deep breath, thought of all the lies he usually had ready for such emergencies, gave up, and told her.

"Because you eat funny."

He watched her face closely, his initial surprise fading, now that the situation was established. First, there was a mildly quizzical expression, quickly followed by a crinkle at the corners of her eyes as she got it, and then the big-mouthed smile and that full, throaty laugh.

"I'll be damned!" she said, shaking her head. That made her short, blue-black hair swirl around her head in a fine cloud that ended just past her ears. God, she wasn't pretty, he thought, she was beautiful—if you only knew how to look.

"I didn't even think about it, especially here, in Emile's!" She waved her hand at the semi-darkness of the small cafe.

Jack nodded, and she finished the hand gesture by raising it higher and snapping her fingers. Almost immediately, Emile himself was standing by the table.

"Two coffees, Emile. Mr. Brower's has grown cold. And make it the special Columbian-Turkish blend, please?"

The portly Emile skittered away, and she turned her attention back to Jack.

"I suppose you know I own this place?"

"Of course," he said, feeling better. This was his ground, safe territory, and he was comfortable with his skill. "I have a list. Besides this place, I discovered you own the apartment complex you live in, several other small businesses, a great deal of real estate, and a bank, to mention a few."

"You missed the ski chalet?"

He shrugged. "Nobody's perfect."

"All this just because I eat funny?"

"Yes."

"On your own? Strictly busman's holiday?"

"Afraid so."

"Like to blind me with your brilliance? Or have you already grown tired of telling the story to your friends?"

It was his turn to smile. Her question was a not-too-subtle one, to see if he'd told anyone else about her. He decided to let her know he'd caught the meaning—and admit that he hadn't.

"Now that you mention it, I would like to tell somebody."

Their smiles started together and matched, as each knew the purpose of the interchange. Did I tell anybody? No, I didn't.

She added the icing.

"You are very good, you know. Bright. I like that."

"Thank you. I take that as a high compliment."

"Well, originally, I was working a domestic for an old friend of mine. Older man, younger wife, younger wife's boyfriend. You know how it goes."

She nodded.

"Anyway, my old friend had managed to ferret out Emile's as the meeting place. All I had to do was set-up here and wait. This was strictly for confirmation—no divorce was intended."

"This took place . . . ?"

"Two weeks ago, today."

Emile returned with the coffee, and he paused to taste it. It was excellent, a full, rich brew, and he told her so.

"Thank you. I selected it firsthand."

He nodded. "Eventually, the star-crossed couple came in holding hands and began cooing at one another. I was dutifully making notes when you arrived for breakfast."

"You were in the back booth, two away from the couple's," she said, matter-of-fact.

His eyebrows went up.

"I'm impressed." He meant it.

"But to continue. I wasn't particularly happy with the job. During twelve years as an investigator, I've learned to avoid most of that kind of case. They generally get pretty sticky, but it was for a friend . . . In any event, I was relatively bored, just filing background away, 'cat-crossed-the-road' sort of details, when you came in."

"So instead of watching the lovers, you began to watch me."

"You brilliant women turn me on," he said with a smile.

"I know. Please go on."

"During my automatic scan, I picked up a flaw—rather the lack of a flaw—so I was so busy watching you I missed them when they left. Very poor of me, and hardly worthy of a professional. But since I had what I needed anyway, I decided to finish my meal and keep an eye on you, just for the hell of it."

"That's the only reason?"

He hesitated for a few seconds. "Actually, no. I am of the belief that almost any function can eventually become a science, pro-

vided one has enough information and/or experience. I've been doing this kind of work for a long time, and I've developed a certain . . . feel. It's difficult to explain, exactly, but—"

"I understand both the theory and the feeling," she broke in. "No need to cover familiar ground." What she was doing to the coffee with her lips was practically obscene, and she knew what effect it was having on his concentration. He tried to look calm and worldly, knew he wasn't fooling her, so he laughed and went on.

"You were too good. Normal people schlock around when they eat. But you never made a mistake, no bad moves, nothing."

Her face was serious, the smile gone, and he noticed suddenly how warm it seemed to be getting.

"You ate that meal as if it were an Olympic event, and you were hands-down winner! Every move was perfect—there was precision, smoothness, absolute control, everything was correct! The movement of the juice glass—it hit the same spot every time you put it down, right on the wet ring. No crumbs fell from the toast onto the table. The fork never clinked on the plate. It was . . . unreal!"

"And you thought . . . ?"

"I didn't know. I'd never seen anything like it. As a detective, I've seen thousands of people eat many more thousands of meals, in every kind of setting, with all sorts of implements. I'm familiar with virtually everything a person might do with food in a public place. I've learned to develop an eye for detail, using little things to pad dull reports, to show I was being . . . scientifically observant.

"In all those years, I've never seen anything like you. It made me curious." He shrugged. "So I tailed you."

"I know. I just didn't know why."

"You spotted me that early?" He was surprised.

"Don't take it so hard. I used to be . . . in your line of work, for a time."

He felt a little better. That would account for it. It was damned hard to tail an op. He didn't bother asking, then, why she'd waited two weeks to confront him. It was what any good investigator would've done. It was easier to pretend ignorance and keep tabs on a known shadow than to risk possibly picking up a new tail. Besides, it would've given her time to check *him* out.

"At first, I put it down to normal male curiosity. I have that effect on men sometimes. But you kept tailing me."

"I might've dropped it, except for another small item. You went to the bank, and were given the VIP treatment, ushered straight into the president's office, no waiting."

"That was hardly justification for continuing. I could've been his wife, or mistress."

He shook his head. "No way. The guy he was with who suddenly was put on hold in the outer office was one of the bank's biggest customers. A wife would've had to wait. And banker's mistresses don't generally visit during working hours—bad for business."

"Still, that's awfully slim—"

"Oh, there's more, of course. I poked around, lied a little, you know the standard detective con-man stuff, and managed to get a little more info."

"Really?"

"Well, not much, actually. But that was a clue in itself. Nobody wanted to talk. Sin of omission kind of thing. So I knew you were Somebody Important."

"And then?"

"I made a few calls, put out a few feelers, dug a little—"

"And found?"

"Almost nothing. I had a name, the fact you were Somebody, and an admittedly subjective observation that you ate funny."

"And you spent two weeks tailing me for that?" She leaned back in her chair, and sipped at her coffee.

"Of course not. I'm a puzzle freak. You didn't fit into any pattern I'd come across before. You were interesting, I wasn't busy, so I did some background work."

"My background ought to check out perfectly."

"It did—almost."

"Almost?" She seemed surprised.

"You were sharp, I'll have to give you that. The identity you took was nearly perfect—parents dead, no relatives, no close friends. The fact the records section of the county court containing your birth certificate had a . . . mysterious fire some years ago was a nice touch." He chuckled.

"School records misplaced, except for those at a large college, where it would be unlikely anyone would remember you, that was good too."

"Then how . . . ?"

"I came up with an old school album, grammar school, actually, with a fuzzy picture of the girl you're supposed to be. The resem-

blance is almost perfect, allowing for twenty years of aging. But even that old black-and-white photo was good enough to show you couldn't be her.

"Her eyes were light, obviously blue, and yours are a smoke-black."

He leaned back, and crossed his arms.

"Contact lenses?", she offered.

"Un-uh, no way. I checked your apartment for them, or cases, wetting solutions—weren't any. I also got some pretty good photos through your bedroom and bathroom windows while you dressed a couple of mornings. No contacts."

"I thought you might like me leaving the windows open."

"You do have a nice shape."

"Thanks. I work at it."

He should have been feeling triumph; but there was something nagging at the back of his mind, something he hadn't had time to consider yet.

"You did know I own the building you were shooting your pictures from, didn't you?"

That slowed him for a second. "No, I missed that one, too."

"You stayed in that room for two days. Like to exchange pictures?" She sipped her coffee.

"The mole on my butt?"

"Of course."

He shook his head. There was that nagging again. He was a pro, and yet he'd never known she even knew she was being watched, much less that she was watching him!

"Now what?"

"I don't know really," he shrugged.

"Surely you must have some theory?"

Here it was. Do it or get off it time. He took a deep breath. "Yeah, well, I had a couple of ideas."

Suddenly, he felt like a mouse being watched by a cat. This wasn't the way he'd planned it at all. The nagging became a question: Just what *was* going on here?

"One thing. Looking back on it now, knowing you knew I was watching you, you could've led me anywhere you wanted me to go. Yet you didn't. Why didn't you do something to throw me off the track?"

"Later. You finish your story first."

"All right. It all kept coming back to the way you moved. Not just your eating, though that was the main giveaway. There was

something . . .

"So I asked myself, how does someone get that smooth, that good at anything? Total concentration, like a Zen monk, that could do it. But that concentration wasn't there. You were doing it automatically, without any effort going into the mechanics."

"You're stalling," she said.

"True," he admitted. "Since no normal person could or should be able to eat that way, I had some options to rule out.

"You could be an android or robot."

She laughed.

"That's what I thought, too. Bionic television heroes to the contrary, no place on our planet is capable of creating your kind of perfection."

"Alien, perhaps?" she said softly, her eyes fixed on his.

"No. Occam's Razor says stay with the simple. You're human, but not ordinary human."

"How does somebody get to be really good at anything?" He said, as if talking to himself. "So good it becomes automatic, unconscious, effortless?

"Only one way. Practice. Something done many times over, again and again, until the waste motions are eliminated. Most people can eat without spilling food all over themselves. Orientals can use two thin sticks of wood to pick up food westerners would fight all day to lift. Simple practice makes the difference."

"Practice over a long period."

"How much practice can a woman who looks under thirty get eating? With a figure like yours? That answer had to be in total number—but I can't see you eating ten meals a day.

"Therefore, if my idea was correct, you have to be . . . older than you appear."

"A tentative line of logic," she said, looking amused.

"True. But logic doesn't always get it. You learn to play hunches in this business, clichéd as that might sound. Because you can't put a scientific name on something doesn't mean it doesn't exist."

"Suppose you're right. Suppose I am, say, fifty. Is it a crime to look younger than you are? A lot of women do, you know. It's a multi-billion dollar industry."

"No. If that was all it was, why go to the trouble to hide your past? Create a false identity? There had to be more to it than that."

"Criminal activities, perhaps?"

"I considered it. But no. You are older than . . . fifty."

"What? Think I'm a doddering old lady of eighty?"

"No. Muscles and nerves start to go down after twenty or thirty. If you were physically much older, there'd be a tremble, a shake, hesitation, something. I've seen old people eat."

"You're beginning to sound like a fantasy novel."

"I've read a few." It really was getting warm in here. He loosened his tie, and undid the top button.

"Even the best cosmetic surgery wouldn't be able to correct neuromuscular function. Physically, you have the body of a woman in her late twenties, early thirties, at the oldest."

"Well," she said, her voice almost a whisper, "enough foreplay. You want to give me the bottom line?"

He hesitated. If his reasoning was sound, she would usually be careful enough to cover herself. It would have to be something as simple as eating that gave her away. And this could be dangerous. But he was certain she already knew what he was going to say, and it was too late to stop.

"I think you are old, very old. Maybe hundreds of years old, I don't know.

"Maybe even immortal."

For ten seconds, the silence was tangible, something he could feel settle over him like a blanket.

"Assuming you are correct, how do you think I might have accomplished such a miraculous feat?"

He let out half his indrawn breath. "Mutant, maybe. Some kind of drug, magic, voodoo, I don't know."

"You could hardly prove such a story—even if it was true."

He felt the sweat running down his spine. "I have friends in police and FBI circles that owe me favors. I'm certain your cover wouldn't be able to stand up to the kind of intensive investigation they could mount, if I asked them."

"You'd do that?"

He looked down at his empty coffee cup. "I don't know. Maybe."

"Supposing you were correct. Don't you think a person who'd lived that long would've learned how to protect herself?"

"I suppose."

"Would it interest you to know I've mastered at least eight major martial arts and two minor ones, and I could kill you before you could move, as easily as blowing out a match?"

He swallowed. "Yeah. That'd be interesting, all right."

She sighed. "You're right, you know. And the first person who

ever figured it out. I am nearly seven hundred years old, plus or minus a few years."

He was stunned. Even suspecting, it shook him. "How—?"

"Simple, actually. My father was an alchemist in central Europe. They knew more than modern scientists ever dreamed. He was searching for a cure for Plague when he hit upon a formula for the *Elixir Vitae*—quite by accident. He started working on small animals, rats, rabbits.

"I was sixteen, only a girl, and therefore of little value, so he tried it on me first. When I survived, he took it himself. Unfortunately, the Elixir has some . . . side-effects—an anaphylactic reaction which mimics a heart attack. It killed him."

Brower was amazed. He was hearing it, and yet, it seemed so unreal, like a dream.

"I'm not immortal, of course, because I'm still aging—but slowly. According to bone epiphysis x-rays, I am about twenty-nine now—that makes the ratio about fifty-odd objective years for every single subjective one."

He did some quick figuring. "At that rate, you could live to be over—"

"—four thousand years old. I know."

"Fantastic!"

"In some ways. But not as much as you might think. I've already had a thousand lovers and time enough to see . . . a lot. I can't have children—another side-effect of the Elixir—which is really not too unfortunate. It would be most distressing to watch them age and die, while I live on and on."

"But you do know the formula?" He held his breath.

"Yes. I've studied it intensively, hoping to improve it. I have degrees in medicine, biology, chemistry, physics and others. I haven't been able to duplicate the formula without producing the dangerous side-effects."

"Then you've—"

"Tried it on others? Yes. Many times. On those I wished to keep, to save. They all died, save one. He stayed with me for nearly a century, before he was killed in some stupid war."

Her face mirrored an incredible sadness from within, and Brower wondered how it must be to not-age, to watch those you'd learned to love grow old and die, leaving you behind. It wasn't a happy thought.

"There are other problems. Every hundred years or so, I have to spend six months in a retreat, using yoga and drugs and medita-

tion techniques to clear my mind of accumulated trash, useless clutter, to avoid senility.

"But the worst and most terrible part is the loneliness. I watch the rapid birth-and-death of those I know, unable to allow myself to become too attached to them. It hurts too much to see them . . . go."

He stared into his empty cup, thinking about that.

"So you see why I must protect my secret. Think about what would happen if the world discovered there was a method of forestalling death, for thousands of years."

He nodded. "Millions would take the risk of death, for such a chance. In the wrong hands . . ."

"You understand. That's why nobody can know about it, about me."

He felt a sudden chill, despite the warmth in the cafe, realizing what she was saying.

"You can trust me," he said hurriedly. "I wouldn't tell!" His face felt both hot and cold, sweat drenching his cheeks and neck, and he felt real fear, for the first time. He had no doubts she was capable of killing him. He wasn't even armed, and he didn't think it would've mattered if he had been.

"I know I can trust you, Jack," she said with a sigh, looking deep into his eyes, to his very soul.

"One way or another."

He looked at his empty cup, squeezing it tightly, his face going pale. When he glanced back up at her, horror was stamped deep into his eyes.

"No, it wasn't poison in your coffee," she said quietly. "At least, I hope it wasn't—this time."

His eyes widened, as the realization stabbed at him like a dagger.

"The *Elixir* . . . ?"

"Yes. Bright men turn me on, too, Jack. And I am so very lonely.

"I hope you make it."

Oh, my God. The answer had been in his cup, all along.

But what was it going to be?

BAT DURSTON, SPACE MARSHAL

by G. Richard Bozarth

art: Frank Kelly Freas

Though Mr. Durston, under various aliases, has roamed the space-lanes since—almost—time immemorial, he first came to general notice when, on the back cover of the very first issue of Galaxy Science Fiction, *that magazine's editor, H.L. Gold, exposed a suspicious similarity between horse operas and the rocket-&-raygun story. "You'll never see it in* Galaxy*!" Mr. Gold vowed; and ol' Bat had to hang up his blasters and anti-grav'd off into the earthset—until, we thought, just this once . . . so here, with a hearty, "Hi-yo, Lorenz-Fitzgerald!" is Mr. Bozarth's very first sale. Now 28, he's been writing since 12 and seriously so since 21.*

Bat Durston pushed the coffee dispenser button with a long, brawny index finger. Behind a clear plastic door a biodegradable disposable mug of authentic 19th-Century American Western Territories design plopped down beneath a spout. A second later the dark, nearly black brew flowed steamingly into the mug.

At completion of the filling cycle, the clear plastic door automatically slid up. Bat Durston hooked the previously described index finger into the mug's finger loop and tasted the brew. It was bitterly strong flavored to reproduce as accurately as possible what archaeologists had determined to be the flavor of the 19th Century American Western Territories coffee.

If Bat Durston ever minded the emphasis on symbology that a space marshal had to put up with, it never showed on his steady, dedicated, ruggedly handsome face. The tall, broad-shouldered, narrow-hipped man had piercingly determined blue eyes and a steady, sober, thin-lipped mouth. Clearly, he was a man who could clean up his parsecs.

Bat Durston walked with quiet, strong grace to his Sector monitor and sat down. He was surrounded by a winking, blinking, gleaming, glowing sophisticated array of electronic wonderments that continually reported the state of law and order in his Sector. He looked like a starship pilot on a starship bridge.

If being nearly the sole foundation of law and order in his parsecs bothered Bat Durston, he did not show it as he sipped the bitter coffee and read the various video reports with unflinching eyes. Folks could be secure with a man like Bat Durston on the job. He would never say it out loud, but their confidence and trust sustained him in the performance of a hard, often dangerous job.

A flashing red light over one screen claimed his attention. The video readout reported the Bad Bart Blackie Gang had just robbed the Transgalactic Conglomerate of its credit transfer authorizations on PhiBetaCrappa IV. Angrily, Bat Durston's eyes narrowed a nanometer as he fed in the reported trajectory of the gang's starship. The calculated projection of possible destinations made the corners of Bat Durston's somber eyes crinkle with mirth.

Pushing a comm button with the same index finger he had already used twice before, he spoke in a low, serious monotone, "Andy, you there, son?"

"Right here, Bat, cleanin' up ol' Igniter," came the bubblingly enthusiastic reply of Bat Durston's young sidekick, Andy, known as Andy the Kid.

In calm monotones that betrayed his fury, Bat Durston explained what had happened, then said, "I reckon by computer figgerin' we can head 'em off at the Horse-Head Nebula. Reckon you'd best get Igniter ready for liftoff. I'll be over directly."

"Great full moons, I shore will, Bat!"

The room lights glinted grimly off Bat Durston's quiet eyes as he opened a door and pulled out a belt and holster. The gleaming synthetic permapolish leather holster held a proton blaster. Bat Durston pulled out the deadly weapon and thumbed the power-pack release. Into his palm plopped the rectangular cartridge. Its load indicator showed a full charge of six destructive shots of pure (yet environmentally safe) proton energy.

Before reloading the blaster, Bat Durston checked the action of the weapon. Due to safety regulations, it required two hands to fire the gun. The gun hand gripping the butt depressed a safety which opened the interlocks that prevented accidental discharges. The trigger was a centimeter-long switch on the top near the rear. It was activated by slapping it with the palm of the triggerhand. This was called "fanning" by gunslingers and space marshals.

Satisfied with the proton blaster, Bat Durston returned it to the holster and stood up with a lethal, yet moral, agility. He strapped the weapon onto his narrow hips, his thin lips in an even straighter line than usual. He did not like to carry a proton blaster, but he knew someone had to if these parsecs were ever to be safe for decent, respectable folks.

Suddenly into the Law Enforcement Command Control Center (locally termed "the Marshal's office") burst Miss Mary. She was a comely young woman with wide, innocent, easily emotional blue eyes and straw-blonde hair. Her father, owner of a robot repair facility, was a hardworking, upright citizen well thought of in the community.

The room lights reflected warmly off Bat Durston's sober eyes as he saw Mary. She was the kind of decent, clean-living sort of girl a man would—well, would want to settle down with after his job was done.

"Howdy, Miss Mary," Bat Durston monotoned romantically.

"Oh, Bat!" Mary gasped, the tears springing to her eyes. "I saw Andy getting Igniter ready for liftoff. Oh, Bat! He—he told me!"

"Now, now, Miss Mary," Bat Durston monotoned nonchalantly.

"Oh, Bat! Don't go! Bad Bart Blackie and his gang are—are—they're so bad—they're—oh, Bat!"

With a burst of affection, Bat Durston took her by the shoulders

and looked steadily into her wetly frightened eyes. "Now, now, Miss Mary," he said in his quiet, rugged, unvarying voice. "Yuh know I gotta. It's mah duty. But—well, thar's a mite more to it."

"More, Bat? Oh, Bat."

Bat Durston's nostrils flared a millimeter in embarrassment as he said evenly, "Well, yeah, ya see, I figger this here Bad Bart Blackie Gang is 'bout the last of the bad ones in these here parsecs. Well, I ain't gettin' much younger, so I'ma guessin' maybe when I got 'em locked up, I oughta—well, hang up my proton blaster and get me a fine, young—" But here words failed Bat Durston.

"Oh, Bat!" Mary cried, impulsively hugging the hard-muscled space marshal. She knew what he could not say and he knew she knew and she knew he knew she knew the unspoken words were the ones she had been longing for him to finally not be able to say.

In a rare burst of passion, Bat Durston pressed his thin lips briefly against Mary's willingly responsive forehead and said, "Now, now, Miss Mary." Avoiding an even more extreme display of emotion, Bat Durston chivalrously tipped his hat, then quickly stepped into a matter transmitter and transferred instantly to his trusty starship, Igniter.

The space marshal was greeted enthusiastically by Andy the Kid, called usually Andy by his friends and sometimes 'son', but only by Bat Durston. Being as Andy was a super-genius cloned in a recombinant DNA laboratory, he wasn't really anyone's son. However, Bat Durston had a fatherly affection for his living supergenius sidekick (standard government issue to all space marshals) and called him son. Bat Durston was not the sort of man to coldly think of Andy as simply another recomb clone; just another Ralph 124C41+ model.

Andy was a tall, slim drink of liquid nutrient with a clean, fresh face, quick, genius eyes, and sloppy blond hair. As soon as he saw Bat Durston, he said, "Ready for liftoff, Bat! I redesigned the quark accelerator this morning, so we can travel even faster than the speed of light than before. I also changed the sheets on our bunks."

"Good, son," Bat Durston said. "Well, thar's a job t'get done an' the Horse-Head Nebula is a fur piece down th' starlanes. Let's lift off."

"Alrighty, Bat!" Andy cried.

No starship was now faster than trusty Igniter, thanks to Andy's

redesigned quark accelerator. They arrived at the Horse-Head Nebula well in advance of the Bad Bart Blackie Gang. Cleverly, they concealed themselves behind a black hole; a feat made possible by another of Andy's inventions, the Blackhole Nullification Concealatron.

Bat Durston easily waited stoically for the precomputed arrival of the Bad Bart Blackie Gang, but the tense pressure eventually got to the much younger Andy. Cracking under the strain, the recomb clone said, "Say, Bat."

"Yep, son?" replied Bat Durston quietly.

"I wuz thinkin', Bat."

"Yep, son?"

"Well, this here Bad Bart is 'bout the meanest of 'em all, ain't he?"

"Yep, son?"

"An' his gang is purty mean, too, ain't they?"

"Yep, son."

"Well, can ya take 'em okay, Bat?"

Realizing his young sidekick was nearly in a panic, Bat Durston took immediate corrective action. He stood up, squarely planting his feet shoulder width apart. He hooked his brawny thumbs on his gunbelt and looked piercingly into some higher moral value somewhere beyond infinity. His square cut chin thrust forward in a ruggedly reassuring way. Andy forgot his previous terror as he quivered with scarcely suppressed excitement, for he knew Bat Durston was about to deliver one of his rare insights into the true depths of life.

"The way I reckon, son," Bat Durston monotoned as the compartment lights glowed wisely off his clear blue eyes, "folks in these here parsecs sorta hanker fer a bit o' respite from th' frustrations of everyday life. I mean t'say, th' meaningless tragedies of everyday life sorta make decent folks want t'see happy endin's an' not more of th' same maddenin', frustratin' failures. So, figgerin' this inta things, I reckon I can take 'em okay. It's mah duty."

Totally awed, Andy sighed, "That there wuz profound, Bat! Why can't I ever thinka stuff like that?"

Managing to smile with fatherly affection without bending the sober, dedicated straight line of his thin lips, Bat Durston said, "Yo're young, son, an' figgerin' out human bein's is a mite harder than understandin' quark accelerators."

This wisdom allowed Andy to get hold of himself and wait out the ambush very nearly as calmly as Bat Durston. It was not

much longer, though, before the Bad Bart Blackie Gang showed up. Instantly, from behind the black hole the two defenders of law and order in Igniter sprang upon their quarry.

Well, criminals are notoriously foolish, so it was not surprising the Bad etc. tried to get away. They actually might have, had not Andy redesigned Igniter's quark accelerator. After a long chase, Bat Durston and Andy aboard trusty Igniter had cornered the Bad Bart Blackie Gang against a single-lined spectroscopic binary.

"Yo're under arrest, Bad Bart," Bat Durston monotoned over the radio.

"Yer gonna hafta draw down ta bring us in," came Bad Bart's sneering reply.

A lock of blond hair fell over Bat Durston's forehead with disgust at this necessary violence as he returned evenly, "I'ma comin' out."

"Let me go with ya, Bat!" Andy begged as Bat Durston got into his spacesuit.

"Not this time, son," Bat Durston replied. "If 'n—well, somebody has t'tell Miss Mary."

"Bat!" cried Andy.

"A man's got t'plan ahead, son. I guess anyone c'n figger wrong."

"Bat!" cried Andy.

"It's mah duty."

Outside Igniter, floating in the weightless void and vacuum of space, Bat Durston, Space Marshal, faced the six evil men of the Bad Bart Blackie Gang alone, unafraid, asking only that if this should be his time, another would pick up his fallen star.

"I'ma givin' yuh one last chance, Bad Bart," Bat Durston said in his most persuasive yet unrelentingly brave monotone.

"I'ma givin' *you* one last chance, Bat Dummy," Bad Bart sneered. "There's just one of you and I count six of us."

"I figger we gotta draw down, then."

Seven hands flashed for seven proton blasters. Incredibly fast were the Bad etc., but faster still was Bat Durston. In a blur of fanning, six ruby-red proton energy bolts disintegrated the six blasters of the bad guys before they fanned off a single bolt. In Bat Durston's opinion, it was a poor space marshal who couldn't bring his men in alive.

Bat Durston thumbed the powerpack ejector as he pulled a full-charged pack from a belt loop. As the empty pack cleared the

pack well, he slammed in the new pack. Realizing their hopeless plight, the Bad Bart Blackie Gang reached for the overhead portion of interstellar space.

"Oh, sizzlin' comets!" one criminal cursed disgustedly.

"This is ridiculous!" cried Bad Bart as he felt maddening, frustrating failure. "Nobody is gonna believe this! This ain't real life! Everything with you, Bat Durston, is nuthin' but space opera! How do ya do it?"

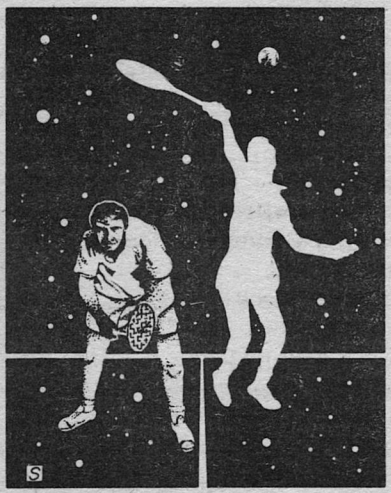
Bat Durston replied in his sober, dedicated monotone, "I don't reckon I know 'bout that. All I know is if 'n this ain't real life, it oughta be."

THIRTY LOVE

by Jack C. Haldeman II

art: Rick Sternbach

With this story, Mr. Haldeman introduces an entirely new set of characters, as well as a wholly different sport, for this latest in his series of sport-based science fiction tales. Enjoy!



Charlie Duncan lived in the future.

When he had been a child, some sixty years ago, it confused him and complicated his life. Now it was second nature. Like double vision, the future superimposed itself over the present to Charlie. The time span varied considerably, sometimes sliding ahead months or years. Usually it ran exactly one point two seconds into the future. It was a strange gift and Charlie had used it well. In spite of his age, he was the third-ranked professional tennis player in the world.

He wiped the sweat out of his eyes.

His opponent's next shot was going to be a high lob to the baseline. By taking two steps back and going a little to his left, Charlie would take an overhead swing and return the ball with a

crosscourt smash that couldn't be handled. He relaxed, let his body go through the motions and nodded his head a split second before he hit the ball. Good shot. Already he could see his opponent's slumped shoulders, his posture of resignation.

Game, set, and match. It was over. Charlie acknowledged the applause from the spectators and went to the net to shake hands with his opponent, a youngster hardly out of his teens. The kid was good, no doubt about that, and next year he'd be better. Next year Charlie wouldn't have to play him. They clapped each other on the shoulders.

Going off the court, Charlie accepted a drink of water and a towel. He signed autographs with good humor and tried to dry himself off. The matches got harder every year.

Charlie was extremely popular with the fans and highly respected by the other pros on the circuit. He carried his tall, lanky frame with a dignity and grace seldom found in those half his age. He had snow-white hair and a short bristly mustache that seemed to twinkle when he grinned. Everything about Duncan seemed to twinkle, especially those eyes that had seen so many years and yet constantly lived in the future.

He allowed himself to be subjected to a number of interviews for the media. The questions were always the same, he'd been answering them for years, but he endured them with uncommon good nature, his patience a gift that age had given him.

He paid particular attention to a young man named Fred Hypes from a newspaper out west, for as they were talking, Charlie flashed segments of Fred's future. It wasn't too clear, as often happened, but the highlights stood out. Something about a terrorist group at a sporting event. There were hostages and guns and Fred was instrumental in saving a number of lives. Out of the tragedy a book, the Pulitzer Prize, followed by a long career as a respected journalist. This wouldn't happen for almost twenty years. Fred was nineteen and paying his dues, but he'd make it.

Tired, Charlie gathered up his rackets and headed for the parking lot.

For a tennis star, Charlie Duncan was unusually quiet and reserved, not at all like the brash youngsters whose careers flared briefly with considerable noise and only marginal talent. Charlie refused to endorse products and always carried his own equipment. He turned down offers of automobiles and limousines, preferring to use his reliable old clunker. He had put fifteen years of spark plugs and oil filters into that car with the same loving care

he used when stringing his rackets. He liked to work with his hands; it made him feel closer to the things around him. He'd hammered every nail in their house on the farm. In a sport dominated by extroverts and cult personalities, Charlie was a welcome island of calm.

He returned to his motel room and took a beer from the small fridge. At home or away, he drank three beers a day. Elinor called it his little vice. Elinor. Her picture stood on the cheap motel dresser. He took it with him, along with a stack of paperback books, whenever he went on the road. He seldom got around to reading any of the books, but the picture was a piece of his life.

He called the farm. Elinor was out back and the phone rang a long time before she answered it. Her voice sounded good, but so far away. The animals were okay, the barn cat had four kittens, life was moving along. She missed him. He missed her. He said that he'd be home soon, this was the last one. Goodbye, see you soon, love. Kiss, miss you, love. They hung up.

The call should have cheered him up, but it depressed him instead. He hated to be on the road, away from her, away from all the things that were so important to him. Well, it wouldn't last much longer. This was his last tournament. After he won the finals tomorrow, he would announce his retirement. It was a "winner-take-all" match, with the victor walking away with $300,000; the loser, nothing. It would finish paying off the farm and there would still be plenty left to live off of. They could be together, the traveling would be over. He finished his beer, ran five laps around the block, took a shower, and went to bed.

He dreamed of wild horses and the days of his youth.

A light breakfast, a leisurely practice game with Bill, and he was on center court warming up. It was already hot. His serve was a little off. The stands were filled, the spectators a blur at the edge of his vision.

For the next hour and a half nothing beyond the boundaries of the court would exist for Charlie. They were fading even as he bounced the ball and took another practice serve. He watched it land a split second before he hit the ball. *Not enough pace,* he thought. *Have to put more on it.* The control was there, but his speed had dropped off considerably in the last couple of years. He still had an edge on his game, but it was getting duller.

Age has nothing to do with it, he thought as one of the hosts introduced them to the crowd. He shook hands with John Nabors,

his opponent. *Twenty-two years old. Just a kid. What do they know anyway?*

He got into position and John's serve came burning across. With a lunge he returned it and the butterflies in his stomach flew away. The game had started and he was all business. Everything disappeared but the ball; where it was, where it would be one point two seconds from now. Working hard, his body flowed across the court. John took the offensive and pushed it, hoping to wear out the older man. Charlie was used to this sort of strategy and paced himself accordingly. The aggressive play would tire the young man too. He let some of the hard shots go by rather than exert himself too much so early in the game. The spectators marveled at his ability to second guess his opponent, anticipate the ball's position. He was never caught out of place.

John won the first of the three sets 6–4, but he was slowing, tiring early. Charlie wasn't too concerned, he knew he would take the second set 6–2. He had flashed the score at that point in the future.

Sure enough, as the second set unfolded, Charlie seemed to gain the upper hand. Slowly he pressed the game. He charged the net more often, playing his lanky frame and long reach to its best advantage. He could see that this unnerved his opponent, so he did it whenever possible. He played easily, gaining momentum as he went along. The points piled up. Even his serve improved. A pair of back-to-back aces seemed to demolish the young man. The second set ended at 6–2 and as the third one started, Charlie was on top of the world. Only one more set to go and he would hang up his racket, settle down with Elinor to enjoy the animals, take some time to savor the damp fog that hung over the farm each morning.

Charlie took the first two games, breaking his opponent's service with ease. He needed only four more and it would all be over.

He was at the baseline, preparing to serve, when it happened. One moment he was staring at John, who was crouched over, rocking on the balls of his feet, twisting his racket nervously in his hands. The next moment Charlie's world split apart. He was flashing the future: a day, a week, a year; time slid by him like a falling deck of cards. It started with John Nabors losing the match and unrolled from there like a ball of twisted string. He would lose more than the match, much more; his confidence, his drive, his will. Broken. No doubt about it, the images were crystal clear. John would never win another match. He was through,

finished, destroyed. He would try his hand at other things and none of them would work. His life was destined to be filled with depression and failure. It was an all-too-familiar pattern and in the split second it took for all this to flash by Charlie, he saw John crumble. Drink. Drugs. Divorce. It was a long, bottomless hole with no way out. He didn't deserve it. Although John was new on the circuit, Charlie knew him fairly well. He was a good man. Young, but bright and willing to learn. He worked hard on his game. He loved his family. There was no way out. Or was there?

A spectator coughed and Charlie slid back into the present. His serve went into the net. So did his second one. A double fault. From there on it was easy. He barely missed shots, botched his returns a little bit, just enough. He let his backhand get a tiny bit sloppy. It wasn't hard to fake. People had been waiting for his body to run down for years. It would come as no surprise.

As Charlie played, he could feel the lines of the future shifting. It made him uncomfortable. This business of changing the future was what everybody did with every action they took. Most people seldom gave it any thought at all except at crucial times in their lives, at places of major decisions. But Charlie lived with it every moment of his life. It was a blessing and a curse. It had brought him a good life, but it had also caused a lot of pain. Every mistake, every wrong word spoken caused a ripple in the future that cut through him like a knife. Casual misunderstandings that caused him to inadvertently hurt other people were a constant source of remorse to Charlie. He lived with the pain, but he kept it deep inside him. It caused him to walk very gently through his life, spreading love rather than hurt like appleseeds in his wake.

He played it close. Tennis had been good to him and he didn't want to shame it by playing a shoddy match. It was turning into a classic that would be talked about for years.

Charlie lost it in what appeared to be a hotly contested tie-breaker. John's winning shot was a magnificent one that just clipped the corner. Even knowing where it was going, Charlie couldn't have gotten there. For the first time, it felt good to lose.

They shook hands at the net and a crowd of reporters hit them before they had gotten off the court. John was sweating buckets, grinning like a goofy ten-year-old boy. His wife hugged him, tears in her eyes. He'd be all right. The sport was in good hands.

Charlie's retirement had been rumored and he confirmed it. He didn't feel bad about leaving tennis. It had been a good career, noth-

ing to be ashamed of. But now he was tired and wanted out. His time had come and passed. It was good to know when to stop. Now he wanted nothing more than to sit with Elinor under the trees on their farm and watch the sun rise and fall. Trees don't change much in one point two seconds; the sun goes its own way without help from any man.

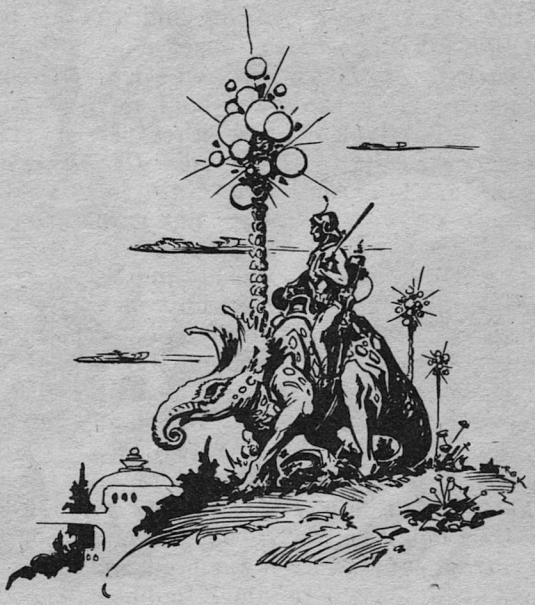
He and Elinor would make do, they always had. Looking back, some of the hard times had been some of the best times. But the future was going to be even better than all the rest.

Charlie knew that for a fact.

EL ROPO TARKAS

"I'm off smokes," said John Carter of Mars;
"There's too much nicotine in cigars,"
But a large nearby Thark
Was observed to remark:
"No, he's just getting damned sick of Tars."

—Randall Garrett



THE VICTOR HOURS
by Ted Reynolds

art: Alex Schomburg


SCHOMBURG

Mr. Reynolds, who neglected to specify the archepelagoes through which he's travelled extensively, has now admitted to familiarity with the Marquesas, the Fijis, and the Lesser Antilles.

I.

He will come plodding north out of the desert, swaying to the rhythm of his riding camel. Nearing Cairo, he pulls his mount to a halt and strikes a histrionic pose.

"Gizeh," he mutters, feeling for an emotion to match the words. "The stately pyramids of Gizeh, half as old as Time." Nothing. "Twice as old as the last time I saw them."

His lips twitch slightly. That gives him something. Not much.

He shrugs, switches the camel into forward gear again, crosses the remaining sands to the relic of Cheops. Dismounting, he switches off the camel, gazes up the giant's staircase from where he stands, and begins the ascent.

Huge blocks half buried in the sands, toys left behind when the Brobdingnagian children grew up and went away. This is the real thing, carefully dismantled on old Earth, transported here, reconstructed with meticulous authenticity.

Sandy is waiting at the pinnacle, seated in an old overstuffed chair, staring out over the desert. He is easily recognizable, though it is centuries since he has seen him so young.

Sandy's boyish face, topped by close-cropped blond fuzz, grins ingenuously down at him as he hauls himself up the last block. "Welcome, Charlest," he says, "or whatever you call yourself these days."

"Still Charlest," he says. "Or Mikami."

"Mikami?"

"My senior wife's family name. Recent custom around Sol."

"I'll stick to Charlest. I'm still Sandy. Always Sandy."

"Good place for it," says Charlest. They stand looking at each other, not knowing what to say next, after the centuries.

"Elizay not here yet?" asks Charlest.

Sandy waves at the empty peak in reply. "She'll be here. . . . You're all right, it appears."

"Fine, fine. We'll wait for Elizay, then start catching up. Plenty of time, right, Sandy?"

"Sure." Sandy swings to look out over the Mediterranean,

dreaming on the northern horizon. "A good place to meet. Look out there. Looks like a storm over Rome, Athens and Byzantium hazed over, but here in Egypt never a cloud."

"Don't spoil the illusion. You're supposed to forget we can almost see across."

"I *can*," says Sandy. "Strong young eyes."

"There's Elizay."

They peer over at the figure struggling up towards them, far below.

"She's old," says Charlest. "Older than when we were married, I'd say. I thought she'd come at her friskiest."

"So she fooled you again. You should know Elizay by now. If she guesses you're expecting something . . ."

The dumpy old woman slumps to rest where she is, looks up and, catching sight of them, waves cheerfully. She makes two more rest-stops before she reaches them.

"Silly old fool," says Charlest lovingly as they haul her up the last step. "You must be all of eighty. If you won't get sellered yet, you might at least get some porters to bring you up."

"Got a sellers treatment scheduled in a few days at Cumae," says Elizay when she's caught her breath, "so you can see me both ways. And I'm *damned* if I'm going to be hauled up here by those dumb automaniacal apparati." She pulls out a neckerchief, starts mopping her crinkled brow. "I'd still be good for years yet, if I chose. But Jeez, it's been just *ages* since I was *this* old. I'd forgotten what it's like."

"As I remember it," says Sandy, "fun always sort of went out of it a couple of decades before where you've got to."

Elizay smiles. "Some people are aiming to be at their best when old, from the time they're born," she decides in mock sagery. "And others, like maybe you, Sandy, are perpetual pimply-faced adolescents, no matter how old they get. Each to their own."

Sandy giggles. "Pimples!" he shrieks gaily. "Good lord, I'd forgotten all about pimples. I wonder when the last human pimple died out."

They squat in a row on the tip of Cheops like three monkeys, solemnly gazing out over the dunland of Egypt.

"Well," says Charlest at last, "we've got a thousand years of catching up cut out for us. Who starts? Who's the oldest?"

Elizay gestures broadly to her withered figure, her creviced face. "I am," she says. "Obviously."

"Poppydash," snorts Sandy. "I was born well before either of

you."

Charlest caps it as expected. "You know neither of you has lived anywhere near as long as I have." He blinks suddenly, surprised again that his memory can contain so much without overload. Soon he really should have it culled.

They will smile and relax. It will be good to be together again.

II.

I held it truth, with him who sings
To one clear harp in divers tones
That men may rise on stepping stones
Of their dead selves to higher things.

Alfred Lord Tennyson
"In Memoriam"

The boy had been left at home without a baby sitter, and was feeling correspondingly grown up. He sat on the couch with his copy of *Peter Pan,* looking at the pictures and wishing he could read better.

There was a thumping sound from the porch. He went over to the curtains and peeked out. Someone was lying on the front steps. He couldn't see who it was, but he wasn't supposed to let anybody in.

He pulled a chair over to the window and stood on it. From up here he could see that it was Grandpa. He wasn't supposed to be here any more; he was supposed to be in the hospital, dying.

Anyway, it should be okay to let Grandpa in. He used to come all the time before he got sick.

The boy unlocked the door and went out on the porch.

Grandpa was lying in a very uncomfortable way, one of his legs up on the porch, his head dangling off the end of the steps among the hydrangeas. He was wrapped in a white sheet, and didn't look ready to get up just yet.

Grandpa opened his eyes and looked up at the boy. One hand twitched and beckoned. The boy knelt down and tried to help Grandpa up. He weighed a ton. The boy had to be satisfied with getting a thin arm under Grandpa's neck and raising his head a few inches.

Grandpa just looked at him, and he felt very peculiar.

"Are you supposed to be here, Grandpa?" he asked anxiously. "I

thought you was supposed to be in the hospital."

The old man's breath came harsh and ragged. He said, "I'm supposed to be with my family when I die."

The word made the boy flinch, he knew it was one of those words adults shouldn't say around kids, but he didn't let on. "You're hurt, aren't you?" he said, trying to keep his upper lip from quivering. "Should I call for a doctor?" Not that he knew how.

"No doctors!" Grandpa tried to make it forceful, but it just wheezed out between weak dry lips. "No more strangers! Just your mom and dad."

"But they're not here!" and now he did feel the tears pushing out inside his eyes. "There's just me."

The old man reached a mottled palm up an inch as if to touch his cheek, and let it fall. "I'm going, little one," he said hoarsely. "I didn't want to go alone, with all those strangers."

"You'll be all right," he said, not believing it for a moment. "You're going to be all right."

The old man's lips curved in humor or pain, he continued as if not hearing the boy. "I'm going . . . where? I wish I knew. I wish I'd gone to church more. . . . Go to church, boy, try to believe in God." His voice rose and sank, nearly inaudible. "I'd like to be with Mollie again . . . oh, God, do you think I will be with her? With the guys who died near me at the Marne? Will I be at all?" His eyes caressed the boy, filled for an instant with near-envy of his youth, his possession of a future, then glazed slightly. "Hold me tight," said Grandpa. "Hold me, Davey."

He held the old man's head, rocked back and forth, sobbing. His name wasn't Davey; that was his father's name.

He held the old man there in the fading twilight, as his grandfather's breath got fainter and fainter, till it just wasn't there at all. He sat there, in a growing terror, too petrified to release what he held. He sat there till his parents would come home and find them and unclasp his hands, and all he could think was, "*This* happens to everybody . . . sometime . . . to Grandpa . . . and Papa . . . and Mama . . . and me. . . ."

III.

Charlest will stand on what might well be Calvary, flanked by his two friends, looking southeast towards Jerusalem and the

Mount of Olives.

It is only a few hours' walk across the desert from Cairo to Jerusalem. The facsimile is rather contracted. People want to see Rome and Athens, Constantinople and Carthage, Damascus and Jerusalem, in the rich detail of what they had been, and they are here in full, or almost. But the long distances that had once separated them are not necessary. The Mediterranean is some ninety miles long, just enough so each landmark is out of sight from the last.

Otherwise, it is almost perfectly authentic.

"Think of it as equivalent to time dilation at c-speeds," suggests Sandy. "Space used only for travelling through is telescoped. Very convenient."

Beneath where they stand, in the upturn of the slope, a group of persons trudge slowly in their direction upon a daily trek.

"I've lived through about two thirds of the last millenium," Elizay resumes the synopsis of her recent life. "Most of it in the Old Places, Sol, Cygni, Eridani, cis-Altair; last century here on the Viblis worlds. Lost most of my off-time on a long vacation to Horlaine, 70 light-years off, near Aldebaran."

"You must have really run through the sellers," says Sandy. "10 or 20, at least."

"More like 40," she laughs. "I haven't always let myself get this superannuated."

"Know how many I've been through?" asks Sandy slyly.

"A lot less, I'm sure, the way you travel."

"One!" says Sandy merrily. "Only one. This is almost the same me you met a thousand years back at our last reunion."

"Where in hell did you go?" asks Charlest.

"Region of Beta Crucis," says Sandy with a grin. "When we left each other last, at Sol, I just looked up the furthest place I could get to, and still be here after a thousand years. Went to Gyluvex, 480 LY from Sol, and 460 from here. Spent 50 years around there, where they're digging up stuff on a hundred planets from an *old* culture, the closest thing to technological vegetative intelligence they've found yet. It was ground-floor exploration, and I was lucky to arrive there at the right time. Came back here and got sellered to age twenty just 10 days back. And here I am."

"You mean to you our last meeting . . ."

"Like yesterday. Only some 55 years back."

"Still gets to me at times like this," muses Charlest. "55 years to you, to Elizay about 700, to me nearly the full thousand."

"Didn't go anywhere, hmm?" asks Elizay.

"Hardly. Just lolled around the Solar System, drawing a sellers every forty years, seeing things change; hell, why be coy, *making* things change, on occasion."

"Tell us?"

"Enough. You get back to Sol, look me up in the archives; better or worse, I made my mark."

"Now who's being coy?" says Sandy. "What field should we scan? Politics, science, literature, thought. . . ?"

"All of them. Well, skip the politics. They've found a way to do without that. Tell you what, though. Two or three reunions from now, we might be able to hold it right down on Old Earth's surface again."

The straggling group is nearly upon them. Wind stirs the hair and beards of the cross-dragging condemned, the pennant borne before the mail-clad centurion, the skirts and robes of the following mourners and tourists.

"Let's go on to Damascus," says Elizay. "I don't particularly care to see this again." They swing away from the city and start for Damascus, half an hour away.

"Shall we take in Palmyra? It's over that hill."

"Don't want to miss anything."

"Did you ever see the real Mediterranean before. . ."

"No," answers Charlest. "Time I got to it, it was already under the crud."

They pace on under the constructed sky, the surrogate sun.

"Ever wonder," asks Elizay, "what would happen if you refused rejuvenation?"

"No wonder," says Sandy. "You'd snuff out. That's called death, woman."

"And after that . . . ?"

"Don't know, don't care to find out. Nothing, I presume."

"Reason I ask," says Elizay, "since I saw you last, knew a fellow did just that."

"He must have been *zonked.*"

"Oh, I'm sure of that. But he did reject the sellers treatment. His pitch was that he'd done all he wanted to on this side of death . . . ten times . . . so if there was anything interesting left, it must be on the other side."

"A kind of sense," says Charlest.

"Zonked!" says Sandy.

"If he lacked interest in life, he should have gone in for hor-

monal readjustment," points out Charlest.

"Rejected that too."

Charlest muses. "That's quite a vicious circle, isn't it? What happened?"

"What do you think? He got older and older, and one day he up and died," says Elizay.

"And what did he find on the other side?" asks Sandy.

"Don't know. He never told anybody."

Sandy runs his fingers through his straw fuzz and frowns slightly, as if pursuing an ancient memory or last night's dream.

They will travel on a long while in silence.

IV.

But who shall so forecast the years
And find in loss a gain to match
Or reach a hand thro' time to catch
The far-off interest of tears?

The island was sheer joy for the children, and for the first time since losing Tammy, he began to feel interest in life again. The three kids Swiss Family Robinsoned on the beaches and shoal water, shinneyed up coconut palms, and went stark raving native on this island without natives. As for him, he worked over the stone *maraes* every day, unearthing long-buried mandibles and an occasional rough-carved *tiki,* and believed he was on the verge of proving that Tahitian culture had retained deep-ocean sailing techniques at least a century longer than anyone had thought.

In the fifth week it turned nightmare.

Seven-year old Maureen slept poorly all night. In the morning her temperature was way up. The symptoms matched nothing in his medical library, and the radio was on the blink.

He had to launch the sailing dinghy. The child couldn't be moved; he'd have to bring help from Roratua. To try to sail alone was madness. Victor had to come along to hold the tiller while he handled the sails, even though trusting to a twelve-year-old was hardly less mad, but what else to do? He gave medical instructions, for what they were worth, to Beth, kissed her, told her they'd be back with a doctor within two days, and set out through the narrow break in the reef.

They swept rapidly southeast over the sparkling heave of the

waves, pushed on by the steady trades. Warm sun, blue water, and the play of the flying fish in silvery leaps. Half-way over to Roratua a school of dolphins paced them over ten miles, snorting and whuffling congenially, until with a single signal, they all veered off and headed away into the Pacific. Tragedy was hard to imagine here.

They swung around the southernmost point of Roratua about two in the morning and started to beat into the channel leading to the small settlement, against the wind. On the fourth tack it took too long to come about and the boat crunched with finality up onto the shallow shoals on the eastern side of the channel. He carried Victor on his shoulders to thigh-deep water, and they watched the boat coming apart in shreds as it was whammed against the coral.

"I'll have to swim in, Victor," he said. "I know it's tough on you, but I'll be picking you up in a couple of hours."

"I can swim," said Victor uncertainly, looking through the dark the three miles to shore. Both knew he couldn't possibly make that distance.

"I know you can, son," he said. "But I can swim faster, and we've got to make the best time we can. I don't want to have to worry about you, too. Best thing you can do to help now is just stick tight here. Sure you can stay awake?"

"Sure, Dad."

Blossoms and salt mingled on the night wind off the island.

"You'll be all right, Victor," he said, as he stripped for the swim. But before he eased into deeper water he said casually, "If you see or hear *anybody,* call out, get picked up, don't wait for me." He struck out for the shore.

It was an hour in, and he was so exhausted that when the swell smashed him into the wharf, he didn't realize his shoulder was dislocated until he had found the doctor.

The motor launch got back to the island, after picking up Victor, in late morning. It ran straight up on the beach, and he leaped painfully out and ran up to the makeshift house. Beth met him at the door, and at once he knew.

"Dad, she's . . . Morrie's *dead*!" she gasped. "Just a few hours ago, she just . . . died!" She fell into his arms. "Oh, Daddy, Daddy, why did it happen?" Her shoulders heaved with horror.

"There, there, Beth," he stroked her hair. "It's all right." Which was a stupid thing to say, since for those who loved Maureen it was all wrong, and for Maureen herself it was all nothing forever.

Why couldn't it have been me, he thought; I'd die for any of them; why wasn't I given the choice to?

V.

Sandy will sit in togaed comfort on the Acropolis, the others at his feet, cool in the shadow of the Parthenon. Busy Athenian life hums about them, mostly robotic, no doubt, but you can't easily tell the players from the props.

They have seen Phidias raise the entablature on the Parthenon, to be torn down at night for rebuilding tomorrow, like Penelope's web. They have heard Socrates debate Zeno and Parmenides, and Pericles eulogize the Athenian dead. Just beyond the mountains to the northwest Mardonius and Pausanius are manuvering near Plataea, and out of sight to the northeast Marathon is being waged to be followed this evening, anachronistically, by Salamis to the south. Great surroundings for military history buffs.

But none of them are interested in battles, anymore. They are waiting for another kind of big event, and every so often their eyes sweep the cloudless blue heavens.

Sandy is regaling the others with the more grisly details of an experience out near Beta Crucis, where he encountered a rather nasty form of mold.

"Green," he says. "Gray-green and greasy. Got at me while I was excavating some undersea ruins. I'd had myself adapted for underwater work, gills and like that. Some of that gunk must have been ingested through my gill system, and I actually began feeling queasy."

"How disgusting," says Elizay.

"Much my thought at the time," admits Sandy. "Well, of course, all I needed was to get out of the influence, and let my body homeostat back to normal, but I did want to finish the diggings, so I kept going back. Every day this slimy coating would crawl over my skin, with shortness of breath . . . I was feeling what used to be called 'sick'!"

"Stubborn ass!" Elizay smiles affectionately.

"Quite. I saw it as an endurance test or something. I finished the diggings. The day I finished my left arm came off . . . just rotted away. My insides were all glunk too, they told me. Well, at least I had *that* experience; I'll pass it up with a clear conscience next time."

"More Chian?" asks Charlest. He refills Sandy's cup. "How long to get over *that* one?"

"Four months. They budded my arm and one lung, the rest homeostatted in its own good time."

The three sit companionably together. Delicately down from the architraves pierce recorded spools of bird-trill. Elizay's eyelids hover dreamily over her aging eyes as she ponders something inwardly, then muses aloud.

"We're related some way, aren't we, Charlest? Way back when?"

"Well, I was your first husband, if that's what you mean," responds Charlest. "I hope you haven't forgotten *that*!" Never quite sure when Elizay's joking, she has both strange amusements and strange lapses.

"I knew it was something like that," she breathes drowsily, "and *we've* never been married, have we, Sandy?"

"I'm your father," he reminds her, as if that answered her question. Sandy dates back a long way.

"It's time," says Charlest. They stretch out their legs, tilt their heads, stare up at the overarching blue sky.

Several minutes pass. Slowly the sky's hue deepens and darkens, the ball of the sun pales to a painless glow. Eclipse draws over the nations. Someone is dimming the lights.

Abruptly there is a glare of incandescent brilliance off above the sky somewhere, and for an electric instant heaven's dome is crisscrossed with the etched tictactoe of polarized field grids responding to the immense energy surge from without. The flare fades slowly. Shortly after, minute sparks of light flicker innumerably far above their heads. They cease. The sky slowly rheostats back to its proper hue.

Fragments of a hitherto useless satellite are now on their way sunwards to form in a new world construction, a replica of 25th-century Venus as man remembers it millenia later.

Charlest heaves himself to his feet and stands looking out over the town towards the port of Piraeus, the sea, and the galleys.

"Rome, anyone?" he asks.

Passing the Erechtheum, Elizay's elderly body stumbles, and the two men are grasping her shoulders at the instant, holding her up.

"I'm quite up to taking care of myself," snaps Elizay with a touch of asperity.

"Forgive my obsolete reflexes," says Sandy, releasing her.

But there's something else here for Elizay, something almost of a *deja vu*. She shrugs it off.

They will descend the slopes of the Acropolis beneath the warm Hellenic sun.

VI.

Let Love clasp Grief lest both be drowned,
Let darkness keep her raven gloss:
Ah, sweeter to be drunk with loss,
To dance with Death, to beat the ground,

She was rock climbing high above her father's cabin in the Sierra. Dad had stayed behind, but her brother and Chuck, with the exuberance of youth, had tackled the toughest climb in sight. She almost wished her brother wasn't along. He had a chaperonish air that made it harder for her to get to know Chuck as well as she'd like to. But he had the climbing experience they lacked, and Chuck was his roommate, so she tried not to snap at him too much.

They had dared each other up the sheer-sliced wall, and when they were something over halfway up, the weather closed in sudden and hard. It was like the flash of a shutter, the jump in a film-strip, and the pleasant challenge had turned to crumbling terror. She clung pressed tight against the rock face, lashed by the rain-laden gusts, and unable to turn her head to see what the boys were doing to her left.

She called out wildly for them, and heard only the rain. She felt the chill seeping into her, and her numbing fingers gripped more desperately at the minuscule cracks keeping her from the long drop behind.

Then, like an angel sent, her brother was beside her, supporting her with an arm behind her back.

"You'll have to inch backwards towards me," he panted. "About ten feet. There's a bit of a ledge. I'll guide you."

"Chuck," she was screaming, "where's Chuck?"

"He's *all right*," her brother gasped rapidly, easing her hold by hold back along the cliff-face in the direction she couldn't see. "He slipped and got knocked silly, is all. I've wedged him onto the ledge." Her left fingers slipped over a larger indentation, a narrow shelf of rock, and her brother was guiding her past him onto it.

"Now *hold on,* Sis!" he told her. "Whatever happens, just hold on!"

She saw his fingers slip.

She lunged out for him from her sprawl on the ledge. Her fingers barely brushed his shoulder, tipped his hair, as he fell from her. Forever after she would have recurring nightmares, that he would have recovered his grasp by himself, that he would have lived, if she hadn't touched him. But he was gone.

So she clung to the ledge through the storm, clung to Chuck's unconscious form, and clung for hours still after the sun came out again, waiting for the rescuers to come. "Dad will be able to see through field glasses," she thought at one point, "that there are only two of us up here. But he won't be able to see who's missing."

Then she tried to go back to not thinking anything at all.

VII.

Elizay, freshly young from the treatments at Cumae, will sit high up in the oval bowl of the Colosseum beside her friends, gazing out over the dusty arena.

"I think much of this will be new to you," says Charlest. "there's a great deal more audience participation built in since you were here last."

His fingers flick over the panel in front of his seat as he speaks.

He explains, "This wedge of the arena in front of us is enough to start with. Let's begin with a standard opening." He presses a stud.

Two figures appear below them on the sand, one bearing a shield and short sword, the other a trident and net. They weave in narrowing circles about one another, dipping and parrying cautiously. The swordsman darts in, stabs, skips away again. The retiarius turns in place, always facing the other.

"A new character," suggests Charlest, punching.

A lion paces into the arena from nowhere, stands taut, tail flicking over haunches, eying the other two contestants. A rough triangle forms. The antagonists feel one another out in a series of attacks, flurries, retreats.

"Tempo dial," points out Charlest, "clockwise for faster action. Then . . . we improvise."

His fingers play with the panel in more subtle detail. The lion

expands in dimensions, grows curving tusks, struts on hind paws like an ape. The gladiator swells to nine-foot height, swirls a razor-edged discus. The retiarius breaks abruptly into a thousand six-inch replicas which charge the others, clamber over them, sink tiny tridents into unprotected parts of their bodies.

"And so on," says Charlest. "It's easy to get the hang of it. Like to try, Elizay?"

Elizay, still a little awkward in her youthful frame, lets Sandy take first turn, but soon they are both caught up in the sport. They grow in skill and ambition. Pygmies battle tyrannosaurs, a pillbox machine-gun nest is overrun by centaurs with bolas, a roc divebombs a PT-boat on a roiling orange ocean.

The arena, when they are through, is littered with the corpses of the dead.

Charlest leans over and presses a last button. The sundry contestants, living and dead, rise, salute the box where the three friends sit, and file leisurely out of the Colosseum.

"That," says Elizay, tossing her braids back over her shoulders, "was really a bit different."

"It begins to wear," says Charlest, "after the thousandth time. Like everything."

The others are silent. He isn't supposed to say things like that out loud.

Finally, Charlest speaks up again. "While you were gone, I did do something a bit different. I died," he says, "I mean, actually died."

"It does happen, does it?" says Elizay.

"It does happen. Keep up your psyche recordings, Elizay. If it happens to you . . . oh, hell, in eternity, *when* it happens, you'll be glad you did. It's a shame to lose any of your life."

"What caused it?" asks Sandy, with real interest.

"Oh, an asininity at a stoned party. I don't remember, of course, for myself, but from what I learned afterwards, it was an attempt to freak out the computerized transport network. Most rapid transport by any available means to designated point on the planet's surface, planet in this case being Gregory. Well, instead of going individually, several of us squeezed into one pod, and told it to send half the party to 60° N., 60° E.; and the other half to 60° S., 60° W."

"I don't know Gregory very well. Where would those coördinates . . ."

"Doesn't matter. There were five in the party. Division was

random. I lost."

Pause. "Oh. Ugh!"

"Dead?" asks Elizay.

"Deader than."

"What did you *do*?"

Charlest *looks* at her.

"I mean, what did they do *for* you?" she blushes prettily.

"Got my clone off ice, of course, and recreated my psyche as of my previous annual recording. Just like a sellers treatment, but years before I expected to need it. But that nine months between my recording and my death . . . I lost it, lost the memories, the continuity. I looked up what I did, but it's not the same. That bothers me."

"You don't *feel* dead?" asks Sandy.

"I'm not dead. *I* didn't really die. I've got my own memories and consciousness, the same genetic body I've grown up with a hundred times . . . that *me* has never been dead. But there was a me, for that nine months, and *he* died. He's gone, and nothing can bring him back."

"I can see how it might bug you," says Elizay quietly.

They sit for a while.

"I'm going for a walk," says Sandy after a bit. "No, thanks. I'd like to be alone."

The other two will sit looking after him as he goes, each drifting in unspoken depths of thought.

VIII.

> Than that the victor Hours should scorn
> The long result of love, and boast,
> 'Behold the man that loved and lost,
> But all he was is overworn.'

Born in the throes of the revolution in physics, the twentieth century will end in the midst of the revolution in biology. One after another the breakthroughs follow in rapid succession. The last barriers to understanding and control topple like falling dominoes, and in a couple of generations they will all be down. Transplants and limb-buds; dyscarcinogens and Bjorsten dissolutions; cryogenic deep-freeze and relativity stasis orbits; clonic and psychic replication; homeostat; sellers rejuv . . . all adumbrated by

1980s, blossoming by 2000s, perfected by 2020s.

All humans born before 1900 will have died.

Virtually all humans managing to live to the year 2000 need never taste of death.

It is a gray, an uncertain area, this late twentieth century. "Some will be taken, and some left."

IX.

The other two will find Sandy on the rim of the ersatz Vesuvius, chucking pebbles into the depths of the crater.

They respect his mood and are silent.

"I was remembering," he says at last, almost whispering.

They know. They stand there and the wind pulls at their draped robes and the sun nears the rim of the horizon.

"Why us?" he continues at last. His face is drawn tight with the pain of the long memory. "Why them?"

"Don't think about it," says Elizay, her youthful face woven beyond its years with care. "It doesn't help."

Sandy continues to stare into the setting sun, his eyes haunted.

"I'm remembering my other children. Why should they have died, and not me?"

"Victor died to save me and Charlest," says Elizay. "If he hadn't, Dad, he'd be here instead of us, and you'd be asking him the same question. . . ."

"Victor was a good boy, a good son," says Sandy. "And I lost him on that damned cliff face . . . and I lost Maureen."

Tears well up in Elizay's eyes. "Morrie *died*! . . . I was waiting for you to bring the doctor back, Dad, and she coughed and coughed and . . . she died! You came too late!"

"I held my grandfather when . . ." begins Charlest, and stops.

"I know, I know," he says at last. "No reason at all. No fairness."

They will stand in silence as the sun dips below the horizon and night spreads over the world, stand silently close together, remembering.

ERRATA SLIP
by Edward Wellen

Mr. Wellen reports that he was born 10/2/19 (of this century), and has too many hobbies to have time for any one of them. His latest project is his first juvenile novel, timed to coincide (he says) with his second childhood.

FOREWORD TO READERS:

We naturally take pride in the preëminence as a reference work of the *Encyclopedia Galactica*. We are aware that this preëminence rests on a sound and hard-earned reputation for accuracy.

Nevertheless, in spite of our striving for perfection, in spite of our attention to detail, errors are inevitable. Computers, after all, are programmed by humans. And to err is . . .

But this is to inform rather than to excuse. We recognize our responsibility to get our facts right, to present them with precision, and to correct such errors as do occur.

As soon as such errors are discovered or brought to our attention, we rush to set the record straight. This ongoing series of errata inputs may therefore be regarded as part of the continuous updating of the *Encyclopedia Galactica,* assuring the subscriber of a source of facts of the highest relevance and the greatest usefulness. Herewith, then, the latest.

VOL X — page 684 |→refs| ADDENDUM

[Elective Affinity of Vestiian Anarchy]

Paragraph 20 reads: "Despite the seeming anomaly of record voter turnouts, anarchy reigned on Vesti III. Newly-elected officials almost immediately became targets for assassination."

Further research would seem to resolve this anomaly. The Vestiians were voting candidates into office precisely because of the extremely vague laws covering assassinations.

VOL VI — page 937 |↓drop| DELETION

[First Contact with Aomrom V]

Entry to the effect that the Galactic Monitor had just received and deciphered warm greetings from the Fhedje, a rising civiliza-

tion on Aomrom V.

Delete entire entry.

This information is no longer relevant since the nova of the Aomrom sun. It would appear that the reading of the message "warm greetings" as a conversational pleasantry was incorrect; the transmission was, in fact, a mayday signal. That it came across as unurgent and nonspecific at the time of reception illustrates the extreme diffidence of the now-extinct Fhedje.

VOL VI — page 1076 |↑subj| CORRECTION

[Figure 63: Typical Mechanization of Murzim VI]

The caption under the noted full-page hologram states "Instructions for assembling a threshing machine." Receipt of new data amends caption to state "Excerpt from a Murzimi love manual."

|¶disc| NOTE TO READERS

We have received several complaints from subscribers in the agribusiness field who have prepared and executed computer simulacra based on the aforementioned illustration. We refer such complainants to the terms of the *Encyclopedia Galactica* Formal Contract:

¶454. *The Encyclopedia Galactica shall not be responsible for damages to life or property resulting from use of the data contained herein, even when such use is "correct" as defined by the Encyclopedia.*

VOL III — page 706 |→refs| ADDENDUM

[Dioznovoz Chronology]

This entry has not been marked with our usual warning as to discrepancies, as the discrepancies are both extremely numerous and extremely obvious. However, the Dioznovoz pretensions seem to have daunted or aroused even some of our older and supposedly more sophisticated clients. More to the point, the Nijjot have found particularly galling the Dioznovoz claim that without the hospitality and assistance the ancestors of the Dioznovoz extended to the Nijjot crew of the starship *Iurut* on its voyage of cosmic exploration, the journey would have ended in disaster before it had begun.

Therefore, we provide the following impartial tape cull, which all subscribers (with the possible exception of the esteemed Dioznovoz themselves) will wish to append:

|θroll| *It is clear that the Dioznovoz have bestowed upon themselves their impossible prèèminance and imposing pedigree because*

they do not wish to own up to their true beginnings. Their species originated during the brief stopover of the starship Iurut *on Lazecnaa IV. The Nijjot exobiologists found the planet's ecosystem implacably hostile, and the vessel moved on. A deposit of Nijjot intestinal flora in depleted organic matrix, however, flourished and evolved/mutated into the ancestors of the current Dioznovoz.*

VOL II — page 497 |←thru| CLARIFICATION

[Nozon, Epic Voyage of the]

This entry recounts in vivid self-astonishment how the Nozon people escaped a dying planet, and after an epic voyage of many megaparsecs, arrived at a new and untouched homeworld.

These statements should in no way be diminished by the data which follow; the Nozon adaptation to a new world was a truly epic achievement. Nor should the legends be slighted which put the lost homeworld in a league with Atlantis, Finnegan's Nowhere, and other gone wonderlands.

But archaeological evidence has discovered the truth. The planet the Nozon set out from (the deteriorating Yadmfadugy) is the same planet they arrived at (the paradisiacal Gilunilcogz.) The Nozon went precisely nowhere.

Rather, they went some*when*. What the then-contemporary technologists placed the natives inside was not a fleet of starships but a stand of time capsules, that the ecologically mauled planet might have a breathing spell to heal itself.

When the Nozon awakened from hibernation upon "Landing," several factors reinforced the illusion of an interstellar voyage. First, the constellations had shifted over several millennia. Second, the Nozon had undergone a biochemically induced shrinking process and so faced a larger planet to go forth and multiply upon.

As a final note in this addendum, we report that the Nozon have adapted excellently to their "new" world. In fact, the inhabitants are known to wear space helmets for clean atmosphere, with darkenable filters for privacy.

VOL XI — page 1543 |↑subj| CORRECTION

[War of Webster's Thigh]

Paragraph 5 reads: "The visitor to Terra's Old Earth Amusement Bark took exception to being called a monster. It replied that it had only followed logic in taking a bite from a sandwich man offering free lunch."

The correct eighth word is "Park," not "Bark."

|¶disc| NOTE TO READERS

In connection with typogarphical errors, allow us to repeat our prediction that we will progressively approach zero incidence. We know full well that we can be ninety-nine point repeater-nine percent sure that to predict accurately one must include the prediction that there will be inaccurate pridictions. But we are constantly upgrading our redundantant safeguards againts error and are confident of ultimate success. We need on*ly poi*nt **analo**usgoly to the sarfe and inficient usaaaghs of unclear injury.

|Ωendt| END RUN

AN ANSWER TO THE TOROIDS OF DR. KLONEFAKE
(from page 29)

Figure 2 shows a sample chain that obviously can be enlarged to include any number of links. If one link is removed, the others are free of one another.

On rare occasions, a pair of toroids grow joined together like Siamese twins. Figure 3 shows two such forms, one linked and one unlinked.

Our second question: Are these two forms topologically equivalent? Think of them as surfaces made of thin rubber that can be stretched, shrunk, and distorted as much as you like provided the surface is never broken or torn. Is it possible, by such deformation, to change one form to the other? For the answer, see page 148.

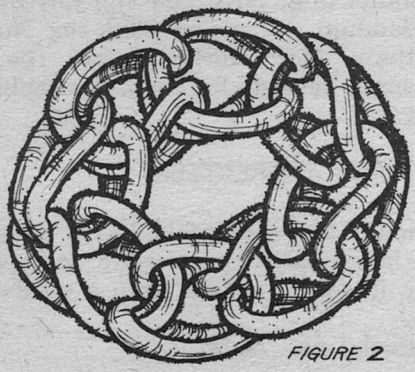


FIGURE 2

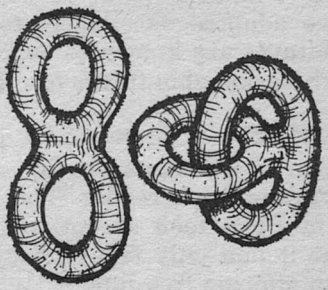
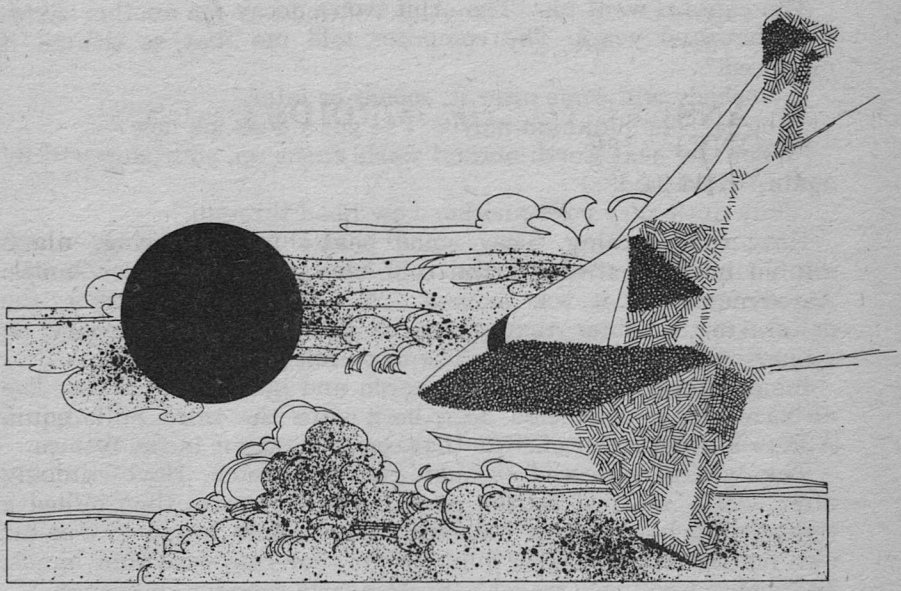


FIGURE 3

INEVITABILITY SPHERE

by Jeff Duntemann

art: Ron Miller



Mr. Duntemann has lived in Chicago all his life—24 years—now on the North Side with his wife Carol. His degree is in English, he works as a technical writer for the Xerox Corporation, and is an amateur radio operator with call letters WB9MQY. His SF has appeared in the anthology series Nova *and* Orbit, *but this is his first magazine sale.*

"That's my ship up there," said the young captain with undisguised bitterness.

Old Tom Hoyt tugged thoughtfully at his beard, and looked up. A brilliant silver point was crawling across the sky, dimmed and sometimes hidden by scudding clouds. The alien air was sharp with its own hint of thunderstorm. Evening's smoky yellows and pinks still hung in the west, but the grey east held flashes of distant lightning.

The captain went on. "The orbit won't decay for another sixty-two thousand years. The computer told me that as though it mattered."

"Somebody will come after it, sooner or later."

"Not me. The junkman maybe. I've got a desk job now."

"When the next Earth-normal world turns up, your ship will fly again," Hoyt said.

"Only until they poke another Low Road through."

Hoyt said nothing. They stood beside his torchwing, which glinted brushed silver in the cold blue airstrip marker lamps. Aerodynamically it was ancient. The fuselage was thicker, the delta wing stubbier than those of the Twentieth Century jet aircraft that had spawned it. The basic lines were the same.

Inside the skin was little but torch and ignition capacitor. The airborne fusion tube had been born with the third millennium A.D., and Hoyt knew of little that could change it in the future.

The captain squeezed through the tiny hatch, Hoyt climbing after. Old Man Hoyt settled them into their webs, then pulled a tight-fitting helmet over his head. The captain began to don his own helmet. Hoyt stopped him. "Cover your ears with your hands. They don't build star travel helmets nearly soundproof enough."

Hoyt started the torch sequence. The torchwing's wings were tanks filled with heavy hydrogen. For half a minute the turbine burned the hydrogen in air, turning a generator with ever-increasing speed. The resultant shriek was painful even through Hoyt's own helmet. The captain was hunched over, thumbs in ears. When the turbine had charged the capacitor bank to capacity, the bank fed its entire accumulated charge to the ignition laser, for one star-hot pulse—

WHAM!

For the thousandth time, Hoyt felt as though it would shake his teeth loose. The turbine sank back to a dull whine, now feeding hot deuterium to the rising burble of the fusion torch. The noise faded from painful to merely maddening.

"How old is this thing?" the captain asked loudly.

"Hundred and forty years."

"They should have scrapped it a hundred thirty-nine years ago."

Hoyt shrugged. "It's what I've got."

He taxied to the end of the airstrip, waited for clearance, and let the torch go. They left the ground at two G's. Graveltown was lost beneath the thickening clouds before they ever saw its tiny scattering of lights. Hoyt punched a familiar course on the autopilot and turned to look at the young captain. His uniform, crisp and spotless, was hung with brass and ribbons. His face was a touch craggy, and very proud. His eyes were humorless and intelligent. Hoyt was troubled by the bitterness and anger he sensed. "You were about to say that this was the crudest thing you ever rode in," observed Hoyt.

"It is."

"Do you know what a tailgunner is, son?"

The captain nodded. "A suicide who shot steel slugs at other suicides in some twentieth-century war. I met one once."

"Meet another one."

The captain's eyebrows rose. "So when did they stop your clock, old man?"

"1996. I'll be seventy-two forever. Time gives you perspective; crude is what's ten years older than what you're used to. I've known men who fought on horseback. But they did it well. That's what counts."

The captain remained silent. Hoyt looked ahead toward the advancing thunderstorm. True Grit's atmosphere was thinner than Earth's, but much deeper. The squall line was a churning black wall rolling out of the east, easily five miles high. Hoyt leveled off at thirty thousand feet and recovered control from the autopilot. That high, the sun had not quite set. The storm flashed purple from within.

The captain was peering ahead, suddenly interested. "I tried to spot it from space. Thought it would be easy. But the weather's been lousy."

Hoyt grunted.

"You fly like you've been a pilot a long time."

Hoyt felt the younger man groping for a reason to respect him. "Quarter of a millennium. More."

"So why didn't you ever get into space?"

Hoyt shrugged. "I'm too old—and too dumb. When I was young space was a kid's dream. Flying a wing is nothing like flying a

starship. That takes real brains. Lots of things to keep straight, all at one time, but it goes slowly enough to let you stop and think. A supersonic wing you have to fly with your reflexes. There's no time to sit back and ask a computer questions. Old habits are hard to break. I never developed space brains."

"Ahhhhhh!" Hoyt looked ahead to where the captain pointed. True Grit's end of the Low Road had just burst through the face of the nearest thunderhead. The Road darted erratically along the squall line for a mile or so, then shot straight up and was lost to sight. It was a thousand-foot sphere of velvet blackness, without feature or reflection.

Moments later it returned from their left, jigging and jogging and doubling back on its path. Hoyt watched the captain's eyes dart back and forth, trying to follow it. It would slow for a heartbeat, jitter almost in place, then dart off in mile-long straight lines too quickly to see at all. The captain shook his head.

"Nothing can move that fast!"

"Right. And nothing is just what it is. It occupies the same space as the air molecules it seems to cover. There's no interaction between it and the atmosphere, or between it and anything that masses less than twenty kilos in one lump."

"So how in hell do you expect to catch it?"

"Instinct," Hoyt said, and grinned. "I've got *good* instincts."

Hoyt was swinging the torchwing in a wide arc, keeping the bounding sphere below and to their left. Instantaneous star travel indeed! It was easy enough to anchor one end of the Low Road a mile over the Mojave desert. But the other end—Hoyt thought of holding a twelve-foot fiberglass fishing rod in one hand and trying to follow a fly creeping randomly across the opposite wall with its tip. Then he imagined a fishing pole twelve light-years long, and put it out of his head.

It wasn't entirely random motion, though it seemed random enough to him. The Low Road was slightly flexible in ways that gave Hoyt headaches to think about. Noise in the control circuits, changing solar wind pressure on the Earth, even minute temblors a thousand miles from the Mojave were multiplied by a seventy-trillion-mile lever. A man who followed that darting black ball could develop a feel for its wanderings; not enough to predict it exactly, but enough to improve his odds of catching it. Improving those odds was what Tom Hoyt did for a living.

Hoyt kept his eyes on the sphere. At last he chose to play his

hunch, and without warning threw the torchwing into a power dive toward a point just ahead of the advancing clouds. The Road hurtled toward the spot, jumped back, and came on again. The captain pressed himself back into his seat and cringed when the wing missed the black sphere by a few hundred feet. Then it was gone, into the clouds, and moments later the storm closed around them.

Hoyt swore under his breath. The torchwing bucked in the storm's rough air. Hoyt glanced aside and saw the young captain breathing rapidly.

"Things seldom happen . . . this fast . . . in space," he said.

"Relax. They usually don't happen this fast dirtside either. That's most of the problem. It's also the only reason I got this job. I have a reputation as a fast flier."

The young man laughed bitterly. "So do I. My ship is a premium speed courier. Too small for cargo, and rather spartan for passengers. I handled all government traffic in documents, credit transfers, and important people. The government never trusted the Low Road with things like that—until now. They want me back on Earth in a bad way. So bad my own ship isn't even fast enough. You have my job now, old man."

Hoyt began wishing for a change of subject. He made a badly-planned dive and missed the sphere by several miles. The captain watched it plummet into the clouds and vanish. Lightning glared around them.

"What happens if it hits the ground?" the captain asked.

"The Road tries to suck the whole planet through to Earth. It doesn't get too far before the breakers blow and the Road vanishes. It takes a month and a billion kilowatts of power to poke it through again. They're careful. Believe me."

"They should have kept it in space."

Hoyt was searching the churning clouds for the Road. It was getting very dark. "It *had* to be in space, when the damned thing wandered through a volume of space a million miles in diameter. Graveltown came through loaded in one-shot re-entry vehicles made of foam lined with brick. One of the unmanned ones burned up with a fortune in farm machinery aboard. Entering a planetary atmosphere from orbit is *dangerous*.

"Control systems improved over the months. The volume of space in which the Road wanders is called its probability sphere. Finding the thing when it was out in space was like trying to find an electron in an orbital. They knew it couldn't be in space

forever, but they couldn't bring it down until they brought the probability sphere tighter than ten miles. It's down to about three now, and getting tighter every week."

"It's crazy," the young captain said.

"It took me to the stars," Hoyt said, "and I was the first man ever to ride it back to Earth again."

"Look!"

Night had fallen completely now. The front had passed and the bulk of the storm was behind them. The sphere had risen, black and invisible, from the writhing clouds below. In an instant it had flickered and ignited to a warm yellow-green.

"I'm glad they can do that," Hoyt said. "I don't like chasing black cats in coal bins. At night it's just me and that big green ball, and no distractions to make things difficult."

Twice more Hoyt dove at the glowing green sphere. Each time he missed by almost a mile. Each time the captain went pale from the acceleration and sudden, gut-wrenching turns.

"This is worse than crazy," he said at last while Hoyt circled, resting. "We've been up here two hours now and gone nowhere but around in circles."

"What was your fastest geodesic through paraspace from Tau Ceti to Earth?" Hoyt asked.

"Eleven days."

"Then my slowest trip is still ten days faster than your best. It's inevitable, son."

"Then it's mighty sloppy engineering, to have to chase your hyperspace tube around the sky like a feather blown in a windstorm."

"The tiniest noise pulse we can measure sends the thing skittering across two thousand feet of sky. Then there's the little matter of matching velocities between two planets rotating on skew axes while revolving around stars moving in two very different directions. All this across eleven light-years distance. Not an easy job."

"But the same job one good starship captain can do without half trying."

The captain sounded frightened, despite his arrogant words. Hoyt looked closely at the shiny buttons and medals. He saw the youth, pale and naked, beneath the awesome uniform. "What sort of job did they find for you? Civilian?"

"Yes." The captain kept his eyes straight forward. "Plotting geodesics in paraspace involves solving systems of equations of a

large number of variables. They said jobs for starship captains were 'uncertain' . . . but that I could have a solid future as senior analyst for the sociometric department of a very large processed food distributor. My first assignment is waiting for me: I am to solve the system of equations describing the way to sell the most breakfast cereal to the largest number of North American eight-year-olds."

Hoyt understood. He dropped the subject, and there was silence in the wing for some time.

It was a bad night. Ten more times Hoyt dove for where he thought his course might intersect that of the Low Road. Each time the sphere chose to move in the opposite direction. Hoyt knew his job was a matter of luck as much as anything else, but knowing what his passenger was leaving behind and knowing what he was going toward kept Hoyt from concentrating.

"Give up, Hoyt," the captain said after they had been aloft for nearly five hours.

Hoyt frowned. "Give up? Think of where I've been, son. When I was born space travel was fiction, child's fiction. I had a little telescope and I wanted to go to the stars, but I took what I could get. I tailgunned in the War and learned flying when it was over. After I retired from soldiering I flew a cargo jet for an air express company until *they* made me retire. I was middle-aged when we landed on the Moon the first time. I was old when MIT let slip that they had a twenty-year-old hamster—which ate its millionth sunflower seed last year, by the way—and I was almost dead when I volunteered to undergo a clock-stopping. I knew damn well the process killed two people for each one it made immortal, but I had damn little to lose. Funny that it takes a suicide to become immortal. But I did.

"So I waited it out. And when space travel arrived in a big way, I couldn't get in because of my physiological age. So I did what I had always done: I flew. One day a friend of a friend got me a rather odd job with the Low Road project. It took me two hundred eighty-eight years to get to the stars, but I'm here. I never give up. And nobody's *ever* going to take the stars away from me!" Hoyt deliberately turned his last statement into a challenge, and threw it in the young man's face.

"Don't preach at me. I'm through. You finished me. Now leave me alone."

Hoyt bit his lip and dove once more at the dancing luminous sphere. He missed by a hundred feet. The captain choked off a cry

of surprise as the mammoth ball lit the cabin with a sickly green light. Angry now, Hoyt threw the 'wing into a tight turn and followed. It went high. Hoyt went after it, straight up, and broke soundspeed with a dull thump. The sphere bounced like a child's ball for a second, and plummeted. Hoyt cursed and followed in a power dive that took them nearly to Mach three. The ball darted to one side and disappeared. Hoyt pulled out and began to circle idly again. The captain looked nauseous from the constantly varying embrace of the crash web. Hoyt's worst night. Perhaps the captain would get one more starship ride.

"Okay. We'll try again tomorrow. The weather . . ."

It happened so quickly that Hoyt had no time to react: a streak of green reared up in the midnight blackness and streaked toward them. It hit them head on.

Crump!

The captain swore in surprise. They were plunging straight down at the mottled barrenness of the Mojave Desert at seven hundred miles per hour. Hoyt's reflexes took over, and he jerked the stick back. The 'wing pulled out a thousand feet above the ground.

"What happened?"

Hoyt shrugged. "Dumb luck. The ball hit *us*. We went through. Never happened before."

It was a brilliant cloudless afternoon over California. Fixed a mile above the ground was a solid ink-black ball a thousand feet in diameter. It was quite immobile.

For no apparent reason, the captain began to laugh. "You're an ass, Hoyt. The three-mile wide volume of space with that big green ball bouncing through it isn't a probability sphere. It's an *inevitability* sphere. Sit still in it long enough, and the ball *has* to hit you. You'd save a lot of energy and time in the long run sitting in the basket of a hot-air balloon and waiting for it."

Hoyt grinned, and threw the challenge back. "Perhaps we could. I think we might be able to ship cargo that way, with a tethered balloon and some patience . . . and I'd be glad to have you as a partner in the venture. *Balloons to the stars!* Jules Verne would have loved it!"

Hoyt turned the torchwing toward the Low Road airfield. They flew wide around a ring of slender concrete towers rising hundreds of feet above the desert rock. Each was surrounded by an . . . aura? Not precisely, Hoyt thought. More a distortion. Light did not travel in straight lines around those towers.

The captain laughed again, more bitterly than before. "Forget it, old man. You're finished too. Give them another year. They're going to shrink that probability sphere more and more, until the True Grit end just sits there and shivers a little. Hell, they'll make it stand stock still! They'll pull it all the way down to the ground. They'll build an approach, like a bridge approach without a bridge, and there'll be a stinking superhighway that starts out in California and ends at Tau Ceti. Then you'll be out of a job too. How will you get to the stars then, old man?"

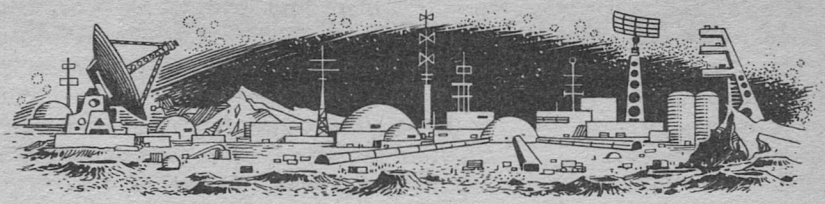
Ahh, the stars, the stars, may they soon belong to all, not only proud soldiers and strange old men . . . Hoyt smiled.

"I'm not above driving a truck, son. Are you?"

REBUTTAL TO $TAR WAR$

One reader, in verse, advises
That *Star Wars* contained no surprises;
  I submit one thing new
  Was a young princess who
Showed both courage and brains in a crisis.

—T'Pat



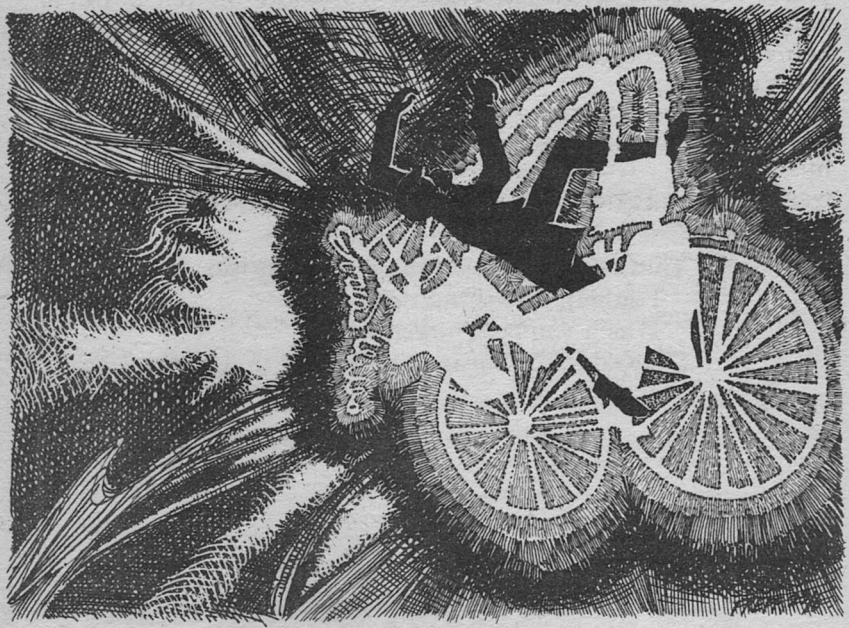
THE ADVENTURE OF THE GLOBAL TRAVELER

or:

THE GLOBAL CONSEQUENCES OF HOW THE REICHENBACH FALLS INTO THE WELLS OF INIQUITIE

by Anne Lear

Art: Freff



Most of the author's professional sales heretofore have been in popular history. With this sale, she has won a contest with her husband to see who can sell a mystery first; this is also her first SF sale. Shakespeare and Sherlock are their household gods.

All I wanted was to find out who the Third Murderer in *Macbeth* really was. Well, I know now. I also know the secret identity and the fate of one famous personage, that the death of another occurred many years before it was reported to have done, and a hitherto unknown detail of Wm. Shakespeare's acting career.

Which just goes to show what a marvelous place to do research is the Folger Shakespeare Library in Washington, DC. In the crowded shelves and vaults of that great storehouse are treasures in such number and variety that even their passionately devoted caretakers do not know the whole.

In my quest for the Third Murderer I started at the logical place. I looked in the card catalogue under M for Murderer. I didn't find the one I had in mind; but I found plenty of others and, being of the happy vampire breed, switched gleefully onto the sidetrack offered.

Here was gore to slake a noble thirst: murders of apprentices by their masters; murders of masters by apprentices; murders of husbands by wives, wives by husbands, children by both. Oh, it was a bustling time, the Age of Elizabeth! Broadsides there were and pamphlets, each juicier than the last.

The titles were the best of it perhaps. Yellow journalism is a mere lily in these declining days. Consider:

A true discourse. Declaring the damnable life and death of one Stubbe Peeter, a most wicked Sorcerer, who in the likeness of a Woolf, committed many murders . . . Who for the same fact was taken and executed . . .

or

Newes from Perin in Cornwall:
Of a most Bloody and unexampled Murther very lately committed by a Father on his own Sonne . . . at the Instigation of a merciless Step-mother . . .

or the truly spectacular

Newes out of Germanie. A most wonderful and true discourse of a cruell murderer, who had kylled in his life tyme, nine hundred, threescore and odde persons, among which six of them were his owne children begotten on a young women which he forceablie kept in a caue seven yeeres . . .

(This particular murtherer is on record as having planned, with true Teutonic neatness of mind, to do in precisely one thousand people and then retire.)

Eventually I found myself calling for *The moft horrible and tragicall murther, of the right Honorable, the vertuous and valer-*

ous gentleman, John Lord Bourgh, Baron of Caftell Connell. committed by Arnold Cosby, the foureteenth of Ianuarie. Togeather with the forrofull fighes of a fadde foule, vppon his funeral: written by W.R., a feruant of the faid Lord Bourgh.

The pamphlet was sent up promptly to the muffled, gorgeously Tudor reading room, where I signed for it and carried it off to one of the vast mahogany tables that stand about the room and intimidate researchers.

As I worked my way through the blackletter, I found the promising title to be a snare and a delusion. The story turned out to be a mediocre one about a social-climbing coward who provoked a duel and then, unable to get out of it, stabbed his opponent on the sly. Pooh. I was about to send it back, when I noticed an inappropriate thickness. A few pages beyond where I had stopped (at the beginning of the forrofull fighes) the center of the pamphlet seemed thicker than the edges. 'Tis some other reader's notes, I muttered, only this and nothing more.

So, it appeared when I turned to them, they were. There were four thin sheets, small enough to fit into the octavo pamphlet with more than an inch of margin on every side. The paper was of a good quality, much stronger than the crumbling pulp which had concealed it.

I hadn't a clue as to how long ago the sheets had been put there. They might have gone unnoticed for years, as the librarians and users of the ultra-scholarly Folger are not much given to murder as recreation, even horrible and tragicall murthers of the vertuous and valerous, and therefore they don't often ask for the bloody pulps.

Further, the descriptive endorsement on the envelope made no mention of the extra sheets, as it surely would have done had they been any part of the collection.

I hesitated briefly. People tend to be touchy about their notes, academicians more than most, as plagiarism ramps about universities more vigorously than anyone likes to admit. The writing was difficult in any case, a tiny, crabbed scribble. It had been done with a steel pen, and the spellings and style were for the most part those of *fin de siècle* England, with a salting of unexpected Jacobean usages. The paper was clearly well aged, darkened from a probable white to a pale brown, uniformly because of its protected position, and the ink cannot have been new, having faded to a medium brown.

My scruples were, after all, academic, as I had inevitably read

part of the first page while I examined it. And anyway, who was I kidding?

"On this bleak last night of the year I take up my pen, my anachronistic steel pen which I value highly among the few relics I have of my former—or is it my future?—life, to set down a record which stands but little chance of ever being seen by any who can comprehend it.

"The political situation is becoming dangerous even for me, for all that I am arranging to profit by my foreknowledge of events as well as from the opportunities civil confusion offers to those who know how to use it. However, my prescience does not in this or any other way extend to my own fate, and I would fain leave some trace of myself for those who were my friends, perhaps even more for one who was my enemy. Or will be.

"To settle this point at once: those events which are my past are the distant future for all around me. I do not know what they may be for you who read this, as I cannot guess at what date my message will come to light. For my immediate purpose, therefore, I shall ignore greater realities and refer only to my own lifeline, calling my present *the* present and my past *the* past, regardless of 'actual' dates.

"To begin at approximately the beginning, then, I found it necessary in the spring of 1891 to abandon a thriving business in London. As head of most of Britain's criminal activities—my arch-enemy, Mr. Sherlock Holmes, once complimented me with the title 'The Napoleon of Crime'."

At this point my eyes seemed to fix themselves immovably. They began to glaze over. I shook myself back to full consciousness, and my hand continued to shake slightly as I slipped the pamphlet back into its envelope and the strange papers, oh so casually, into my own notes. After an experimental husk or two I decided my voice was functional and proceeded to return the pamphlet and thank the librarian. Then I headed for the nearest bar, in search of a quiet booth and beer to wash the dryness of astonishment and the dust of centuries from my throat.

The afternoon was warm, a golden harbinger in a grey March, and the interior of the Hawk and Dove, that sturdy Capitol Hill saloon, was invitingly dark. It was also nearly empty, which was soothing to electrified nerves. I spoke vaguely to a waitress, and by the time I had settled onto a wooden bench polished by but-

tocks innumerable, beer had materialized before me, cold and gold in a mug.

The waitress had scarcely completed her turn away from my table before I had the little pages out of my portfolio and angled to catch the light filtering dustily in through the mock-Victorian colored window on my left.

". . . I had wealth and power in abundance. However, Holmes moved against me more effectively than I had anticipated, and I was forced to leave for the Continent on very short notice. I had, of course, made provision abroad against such exigency, and, with the help of Colonel Moran, my ablest lieutenant, led Holmes into a trap at the Reichenbach Falls.

"Regrettably, the trap proved unsuccessful. By means of a Japanese wrestling trick I was forced to admire even as it precipitated me over the edge, Holmes escaped me at the last possible moment. He believed he had seen me fall to my death, but this time it was he who had underestimated his opponent.

"A net previously stretched over the gulf, concealed by an aberration of the falls' spray and controlled by Moran, lay ready to catch me if I fell. Had it been Holmes who went over the edge, Moran would have retracted the net to permit his passage down into the maelstrom at the cliff's foot. A spring-fastened dummy was released from the underside of the net by the impact of my weight, completing the illusion.

"I returned to England in the character of an experimental mathematician, a *persona* I had been some years in developing, as at my Richmond residence I carried out the mathematical researches which had been my first vocation. I had always entertained there men who were at the head of various academic, scientific, and literary professions, and my reputation as an erudite, generous host was well established. It was an ideal concealment for me throughout the next year, while my agents, led by the redoubtable Colonel, tracked Mr. Holmes on his travels, and I began to rebuild my shadowy empire.

"During this time I beguiled my untoward leisure with concentrated research into the nature of Time and various paradoxes attendant thereon. My work led me eventually to construct a machine which would permit me to travel into the past and future.

"I could not resist showing the Time Machine to a few of my friends, most of whom inclined to believe it a hoax. One of the

more imaginative of them, a writer named Wells, seemed to think there might be something in it, but even he was not fully convinced. No matter. They were right to doubt the rigmarole I spun out for them about what I saw on my travels. Mightily noble it sounded, not to say luridly romantic—Weena indeed!—although, as a matter of fact, some few parts were even true.

"Obviously, the real use to which I put the Machine during the 'week' between its completion and my final trip on it was the furtherance of my professional interests. It was especially convenient for such matters as observing, and introducing judicious flaws into, the construction of bank vaults and for gathering materials for blackmail. Indeed, I used 'my' time well and compiled quite an extensive file for eventual conversion into gold.

"As I could always return to the same time I had left, if not an earlier one, the only limit to the amount of such travelling I could do lay in my own constitution, and that has always been strong.

"My great mistake was my failure to notice the wearing effect all this use was having on the Time Machine. To this day I do not know what part of the delicate mechanism was damaged, but the ultimate results were anything but subtle.

"I come at last to the nature of my arrival at this place and time. Having learned early of the dangers attendant upon being unable to move the Time Machine, I had added to its structure a set of wheels and a driving chain attached to the pedals originally meant simply as foot rests. In short, I converted it into a Time Velocipede.

"It was necessary to exercise caution in order to avoid being seen trundling this odd vehicle through the streets of London during my business forays, but there was nothing to prevent my riding about to my heart's content in the very remote past, providing always that I left careful markings at my site of arrival.

"Thus did I rest from my labors by touring on occasion through the quiet early days of this sceptered isle—a thief's privilege to steal, especially from a friend—ere ever sceptre came to it. Most interesting it was, albeit somewhat empty for one of my contriving temperament.

"It was, then, as I was riding one very long ago day beside a river I found it difficult to realize from its unfamiliar contours would one day be the Thames, that the Velocipede struck a hidden root and was thrown suddenly off balance. I flung out a hand to stabilize myself and, in doing so, threw over the controls, sending myself rapidly forward in time.

"Days and nights passed in accelerating succession, with the concomitant dizziness and nausea I had come to expect but never to enjoy, and this time I had no control of my speed. I regretted even more bitterly than usual the absences of gauges to indicate temporal progress. I had never been able to solve the problem of their design; and now, travelling in this haphazard fashion, I had not the least idea when I might be.

"I could only hope with my usual fervency and more that I should somehow escape the ultimate hazard of merging with a solid object—or a living creature—standing in the same place as I at the time of my halt. Landing in a time-fostered meander of the Thames would be infinitely preferable.

"The swift march of the seasons slowed, as I eased the control lever back, and soon I could perceive the phases of the moon, then once again the alternating light and dark of the sun's diurnal progression.

"Then all of a sudden the unperceived worn part gave way. The Machine disintegrated under me, blasted into virtual nothingness, and I landed without a sound, a bit off balance, on a wooden floor.

"A swift glance around me told me my doom. Whenever I was, It was in no age of machines nor of the delicate tools I required to enable my escape.

"Reeling for a moment with the horror of my position, I felt a firm nudge in the ribs. A clear, powerful voice was asking loudly, 'But who did bid thee join with us?'

"The speaker was a handsome man of middle age, with large, dark eyes, a widow's peak above an extraordinary brow with a frontal development nearly as great as my own, a neat moustache, and a small, equally neat beard. He was muffled in a dark cloak and hood, but his one visible ear was adorned with a gold ring. As I stood dumbly wondering, he nudged me again, and I looked in haste beyond him for enlightenment.

"The wooden floor was a platform, in fact a stage. Below on one side and above on three sides beyond were crowds of people dressed in a style I recognized as that of the early seventeenth century.

"Another nudge, fierce and impatient: 'But who did bid thee join with us?'

"The line was familiar, from a play I knew well. The place, this wooden stage all but surrounded by its audience—could it possibly be the Globe? In that case, the play . . . the play must be . . . '*MACBETH*!' I all but shouted, so startled was I at the sud-

den apprehension.

"The man next to me expelled a small sigh of relief. A second man, heretofore unnoticed by me, spoke up quickly from my other side. 'He needs not our mistrust, since he delivers our offices and what we have to do, to the direction just.'

" 'Then stand with us,' said the first man, who I now realized must be First Murderer. A suspicion was beginning to grow in my mind as to his offstage identity as well, but it seemed unlikely. We are told that the Bard only played two roles in his own plays: old Adam in *As you Like it,* and King Hamlet's ghost. Surely . . . but my reflections were cut off short, as I felt myself being covertly turned by Second Murderer to face upstage.

"First Murderer's sunset speech was ended, and I had a line to speak. I knew it already, having been an eager Thespian in my university days. Of course, to my companions and others I could see watching from the wings most of the lines we were speaking were spontaneous. 'Hark!' said I. 'I hear horses.'

"Banquo called for a light 'within', within being the little curtained alcove at the rear of the stage. Second Murderer consulted a list he carried and averred that it must be Banquo we heard, as all the other expected guests were already gone into the court. First Murderer proffered me a line in which he worried about the horses' moving away; and I reassured him to the effect that they were being led off by servants to the stables, so that Banquo and Fleance could walk the short way in. 'So all men do,' I said, 'From hence to th' Palace Gate make it their walk.'

"Banquo and Fleance entered. Second Murderer saw them coming by the light that Fleance carried, and I identified Banquo for them, assisted in the murder—carefully, for fear habit might make me strike inconveniently hard—and complained about the light's having been knocked out and about our having failed to kill Fleance.

"And then we were in the wings, and I had to face my new acquaintances. Second Murderer was no serious concern, as he was a minor person in the company. First Murderer was a different matter altogether, however, for my conjecture had proved to be the truth, and I was in very fact face to face with William Shakespeare.

"I am a facile, in fact a professional, liar and had no trouble in persuading them that I was a man in flight and had hidden from my pursuers in the 'within' alcove, to appear among them thus unexpectedly. That Shakespeare had been so quick of wit to save

his own play from my disruption was no marvel; that the young player had followed suit was matter for congratulation from his fellows; that I had found appropriate lines amazed them all. I explained that I had trod the boards at one time in my life and, in answer to puzzled queries about my strange garb, murmured some words about having spent time of late amongst the sledded Polack, which I supposed would be mysterious enough and did elicit a flattered smile from the playwright.

"As to my reasons for being pursued, I had only to assure my new friends that my troubles were of an amatory nature in order to gain their full sympathy. They could not afford openly to harbor a fugitive from justice, although players of that time, as of most times, tended to the shady side of the law, and these would gladly have helped me to any concealment that did not bring them into immediate jeopardy. As I was but newly arrived in the country from my travels abroad, lacked employment, and could perform, they offered me a place in the company, which I accepted gladly.

"I did not need the pay, as I had observed my customary precaution of wearing a waistcoat whose lining was sewn full of jewels, the universal currency. However, the playhouse afforded me an ideal *locus* from which to begin making the contacts that have since established me in my old position as 'the Napoleon of crime', ludicrous title in a time more than a century before Napoleon will be born.

"As to how my lines came to be part of the play's text, Will himself inserted them just as the three of us spoke them on the day. He had been filling the First Murderer part that afternoon by sheer good luck, the regular player being ill, and he found vastly amusing the idea of adding an unexplained character to create a mystery for the audience. He had no thought for future audiences and readers, certainly not for recondite scholarship, but only sought to entertain those for whom he wrote: the patrons of the Globe and Blackfriars and the great folk at Court.

"I am an old man now, and, in view of the civil strife soon to burst its festering sores throughout the country, I may not live to be a much older one. I have good hopes, however. Knowing the outcome is helpful, and I have taken care to cultivate the right men. Roundheads, I may say, purchase as many vices as Cavaliers, for all they do it secretly and with a tighter clasp on their purses.

"Still, I shall leave this partial record now, not waiting until I

have liberty to set down a more complete one. If you who read it do so at any time during the last eight years of the nineteenth century, or perhaps even for some years thereafter, I beg that you will do me the great favor to take or send it to Mr. Sherlock Holmes at 221-B Baker Street, London.

"Thus, in the hope that he may read this, I send my compliments and the following poser:

"The first time the Third Murderer's lines were ever spoken, *they were delivered from memory.*

"Pray, Mr. Holmes, who wrote them?

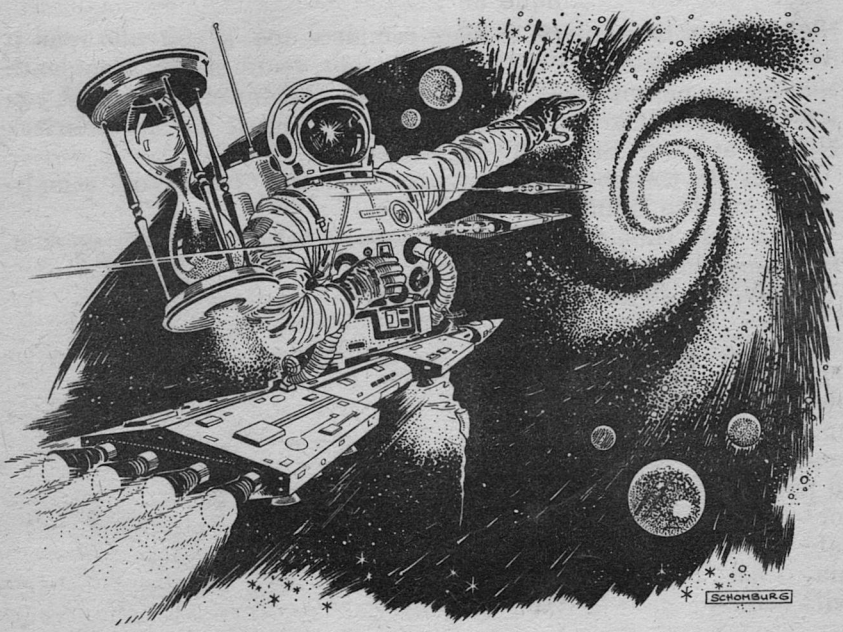
"Moriarty
"London
"31st December 1640"

ON MAN'S RÔLE IN THE GALAXY

by R. N. Bracewell

art: Alex Schomburg

Ronald N. Bracewell is Lewis M. Terman Professor of Electrical Engineering at Stanford University, working in the general field of radio astronomy. He is the author of The Galactic Club: Intelligent Life in Outer Space. *At the present time, Professor Bracewell is actively studying a satellite-borne infrared interferometer project that might be able to detect the existence of planets around stars other than our sun.*



It is often argued that our sun is an average star, that it is situated in an inconspicuous place neither in the middle of nor on the edge of the Galaxy, that the Earth is not the center of the universe as Ptolemy supposed, and that the Mediterranean is not the center of the world as the Romans evidently thought. In fact it is pointed out that whenever man has assumed that he occupies a privileged position he has been demoted to a humbler position as knowledge has expanded. Therefore, it is said, it would be wrong to assume that we are unique in being the only life in the Galaxy. As Gus Arriola's comic strip character Porfirio put it, "Panchito! It'd be gross conceit to imagine that in all those awesome endless galaxies we are the only worms!"

Whether it would be conceit or not, it would be an assumption. The danger in reasoning from such a position is evident when we apply the averageness argument to intelligent life on the Earth. Would it be a gross conceit to suppose that in all the hundreds of thousands of living animal species populating the plant Earth that we are the most intelligent species? Apparently not, seeing that we really *are* a unique species on earth. Why then should we not be unique in the Galaxy?

Not only are we unique on Earth, but we are unique in the solar system. Now here is an interesting line of thought. Some many years ago there were no intelligent humans on the North American continent, but there were intelligent humans in Africa. It seems that apes already endowed with special abilities as regards hand, eye, and brain descended from the trees and spread over the African savannah, growing in intelligence as they engaged in group hunting. They developed tools and weapons and came ultimately to derive more advantage from language and transmitted instruction than from continued bodily evolution.

Why shouldn't an intelligent bear have emerged from the North American forest onto the prairie and developed along similar lines? Perhaps given time, this might have occurred. It could never happen now, because even minor threats from predators are handled very sternly by human settlers; witness the virtual disappearance of the wolf and grizzly bear. But in the days before man reached North America why should not an intelligent rival to man have developed from some bearlike or raccoonlike ancestor? There have been many cases of convergent evolution on separate continents; examples are the marsupial cats and the Tasmanian tiger, which in Australia evolved to fill niches occupied by wild cats and dogs in Asia. Very similar creatures developed from

quite dissimilar ancestors.

The reason that no intelligent species arose on the American prairies or the Siberian steppes or the South American pampas is a very simple one. In the time needed for such evolution to take place, tens to hundreds of millions of years, the early models of primitive man originating in Africa were able to walk all over the earth, except for Antarctica, and preëmpt further natural evolution of independent intelligent species elsewhere.

From Africa to America may be a long walk, and the going was undoubtedly rough, but I should think that 10,000 years would suffice. Under the influence of population pressure gradient, family groups would migrate outward—sometimes imperceptibly, sometimes on longer marches. An average speed of one mile per year does not seem unreasonable. Thus, although no conscious intention existed to cover long distances, nevertheless that is what happened. The persons arriving at the ultimate destinations were not the same persons that set out, and they never returned to their original homeland. In fact they completely lost memory of their origins. We need only recall that when the great European voyages of discovery began in the fifteenth century, the scattered races of man began to gain mutual awareness of their existence over the whole of the Earth for the first time.

We are accustomed to speak of the Earth as inhabited by humans but of course most of it is inhabited courtesy of remarkable developments in Africa, which—at one time—was the only habitat of man. We regard Antarctica as inhabited by man because the numerous permanent expeditions on that icy continent maintain a steady population in the hundreds. But it is hard to think that intelligent life might ever have evolved there independently. Now, before many decades pass, there will be expeditions on the Moon and Mars, and there will be interplanetary space colonies, and we will be accustomed to saying that the solar system is inhabited; and indeed it will be, but not because life originated or could have originated there, given time, but because life got there by migration (just as it has migrated all over the Earth) long before evolution had a chance to try a new and independent tack.

I am leading up to an interesting idea. After we have explored the solar system, or even before that exploration is completed, it will become technically feasible to send probes to nearby stars and in time to send expeditions. I am not thinking necessarily of round-trip expeditions, where those setting out from home also return home, but of something more akin to migration. Under these

conditions, speed is not of the essence and thus many of the scientific objections to space travel that have been voiced by prominent physicists do not apply. It is not necessary to travel at speeds approaching the speed of light if you are not planning to come back; consequently great feats of rocketry are not required.

It is not clear to me what motives will impel the migrants to travel. We can hardly draw a parallel with our hunting and gathering ancestors whose movements may have been controlled largely by food supply. But conceivably forces of political and religious persecution, which have caused substantial migration in the past, could become factors. Population pressure is sometimes mentioned. In any case, when the possibility comes to exist, will not some group at some time seize it?

In time, space migration could spread terrestrial civilization out into our Galaxy. Now the key question here is, how long will this take in comparison with the characteristic time for independent evolution?

The factual piece of information we have about evolution is that it took about five billion years for man to appear on Earth following the formation of the Earth. If conditions had been more favorable in some way, it might have taken less time, perhaps one billion years. Certainly if conditions had been less favorable it could have taken much longer, as we see from the examples of Venus, Mars and the Moon.

If man can migrate into neighboring galactic space in noticeably less than a billion years, then he will undercut independent evolution just as he has already done in the continents outside Africa and the solar system. Whatever stage that life may have reached in the favorable habitats that our spacefaring descendents discover, continued natural evolution there will be hampered by man's arrival.

If, on the other hand, a billion years is to elapse before we significantly penetrate the Galaxy, then we must entertain the likelihood that a certain fraction of the (as yet unknown number of) suitable planets may have intelligent life. So let us quickly do the calculation. Just as we do not know whether the migrants from Africa to America averaged one mile per year, or ten times more or ten times less, so we also do not know with what velocity we might migrate into space. However, to gain a feeling for the numerical magnitudes involved let us adopt one per cent of the speed of light as an average speed, that is 3000 kilometers per second. This speed, while high, is rather modest by fictional space

travel standards. For example, at this rate it would take 450 years merely to reach the Alpha Centauri system. Now the Galaxy is immense, and it might be considered a significant penetration of the Galaxy if we were to reach, say, the closest thousand stars. But as a Galactic yardstick I am going to adopt 30,000 light years, which is the distance from here to the center of the Galaxy.

At one per cent of the speed of light that distance would take 3,000,000 years. Thus the calculation comes out resoundingly in favor of migration rather than independent evolution as a means of civilizing the Galaxy. In other words, confronted with the problem of endowing the Galaxy with intelligent life, a master planner's best strategy would be to do a good job in one place and let the intelligent life spread out from there.

Are there weak points in this reasoning? Well, the average speed of space travel, though modest, is necessarily conjectural. Still, even if the assumed speed is reduced ten or one hundred times, the conclusion is unchanged. On the other hand, who knows what higher speeds might not be achievable by our descendants in the course of time? We are discussing events that will be spread over the next million years or so of the history of the human race.

Another feature to consider is that there are many other stars that have been around as long as or longer than our sun. Since intelligent life did arise here we cannot absolutely exclude current intelligent life elsewhere. There may very well be some, and we should take the possibility into account even though it can reasonably be pointed out that America was around as long as Africa, and Mars was around as long as Earth. Furthermore, it remains to be shown that other stars have planets. Even so, other intelligent life cannot be ruled out merely by reasoning. If such intelligences exist, then my idea applies to them too. They also may become centers of expanding spheres of migration, and for all we know may already have begun to expand. There has been plenty of opportunity.

The Universe dates back about 15 billion years to the big bang. Star formation began almost immediately, and generations of stars have been born and have lived out their lives since then. The first generation of stars is not likely to have provided life niches, certainly no rocky planets with oceans, because in the beginning there was only hydrogen and some helium. Oxygen, which is needed for water, did not exist at that time but was

manufactured in the interiors of those first stars. It is interesting to contemplate the human body, the vehicle of the intelligent life that we are discussing, and to note that most of it is water—hydrogen and oxygen. *Numerically,* the majority of the atoms in our bodies are the selfsame hydrogen atoms that took part in the big bang and have come down to our times unchanged since then. The atoms constituting the majority of the *mass* of our bodies are oxygen atoms whose history is quite different. They originated in nuclear reactions inside stars at immense pressures and temperatures, were later expelled explosively as the star burnt out, and became a trace constituent of the interstellar matter from which second-generation stars condensed. The same story holds for the carbon atoms whose unique and rich chemistry is the basis of all known life. *Thus, in ourselves, we are profoundly cosmic creatures who are now discussing the conscious redistribution of ourselves back into galactic space.*

By cosmological standards, the million years or so that would suffice to penetrate the Galaxy by space travel is a mere instant. An outside observer who had inspected our Galaxy thousands of times at regular intervals since its birth would find intelligent life all over the Galaxy on one of his inspections whereas there had been only isolated pockets on his previous inspection. It is hard to believe that intelligent life has already flashed through our Galaxy, for no signs of it have been detected. Therefore I am inclined to think that favorable conditions for development of intelligent life are *not* abundant, suitable planets are *not* common, and that man may *indeed* be unique or quasi-unique. The only way to find out is to *do* something, such as searching for nonsolar planets; speculation will not tell us.

Still, the prospect of man's uniqueness certainly has an impact on man's view of himself. Instead of seeing ourselves as a rather ordinary byproduct of stellar evolution, whose accidental demise would have very little impact on the Galaxy as a whole, we are presented with a broader vision of a remarkable destiny to transmit consciousness through the Galaxy. The fragility of such a cosmic plan, if I may so describe it, is extreme; yet despite many setbacks, life on Earth did rise to the point where inanimate atoms, mere products of a lifeless universe, bundled together and staring up into the sky, could begin to ask questions about and even dimly to understand the universe. How you and I, trifling subsets of the atoms of the universe, can be conscious of the whole, is a mystery. Although we are indeed mere byproducts of

natural universal laws governing stars, galaxies, and the whole Universe, we are already beginning to influence the course of natural events on Earth. It may be man's noble rôle, as I am suggesting here, to spread this new phenomenon of consciousness through the Galaxy.

SECOND SOLUTION TO THE TOROIDS OF DR. KLONEFAKE (from page 122)

The two Siamese forms are topologically identical. To prove this, imagine the linked form deformed to a sphere with two "handles" as shown in Figure 4. Now imagine the base of one handle being moved over the surface, by shrinking the surface in front and stretching it in back, along the path shown by the dotted line. This links the two handles. The structure is now easily altered to correspond with the linked form of the Siamese toroids. (Thanks to Jim Timourian, Princeton University, for this.)

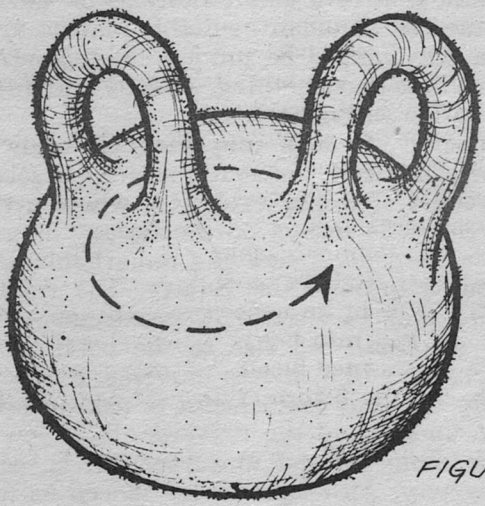


FIGURE 4

SCRAP FROM THE NOTEBOOKS OF JOHANN WOLFGANG VON GOETHE

by K. W. MacAnn

art: Freff

Mr. MacAnn tells us that, at 24, he is an instructor at a private high school in Chicago and a free lance copywriter for an advertising agency. In addition to the usual sports, he raises (and sometimes buries) tropical fish.

This story, for all its fantasy trappings, still fits Dr. Asimov's definition of SF. We know this sounds defensive–but–well, read the story and enjoy, enjoy.

Faust and Mephistopheles entered the tavern and shed their heavy overcoats. The barmaid needed only to look once at Faust's expression before she scurried off to get him a brandy. Mephisto helped the good doctor into a chair. Faust slumped down, his face the color of dead ash.

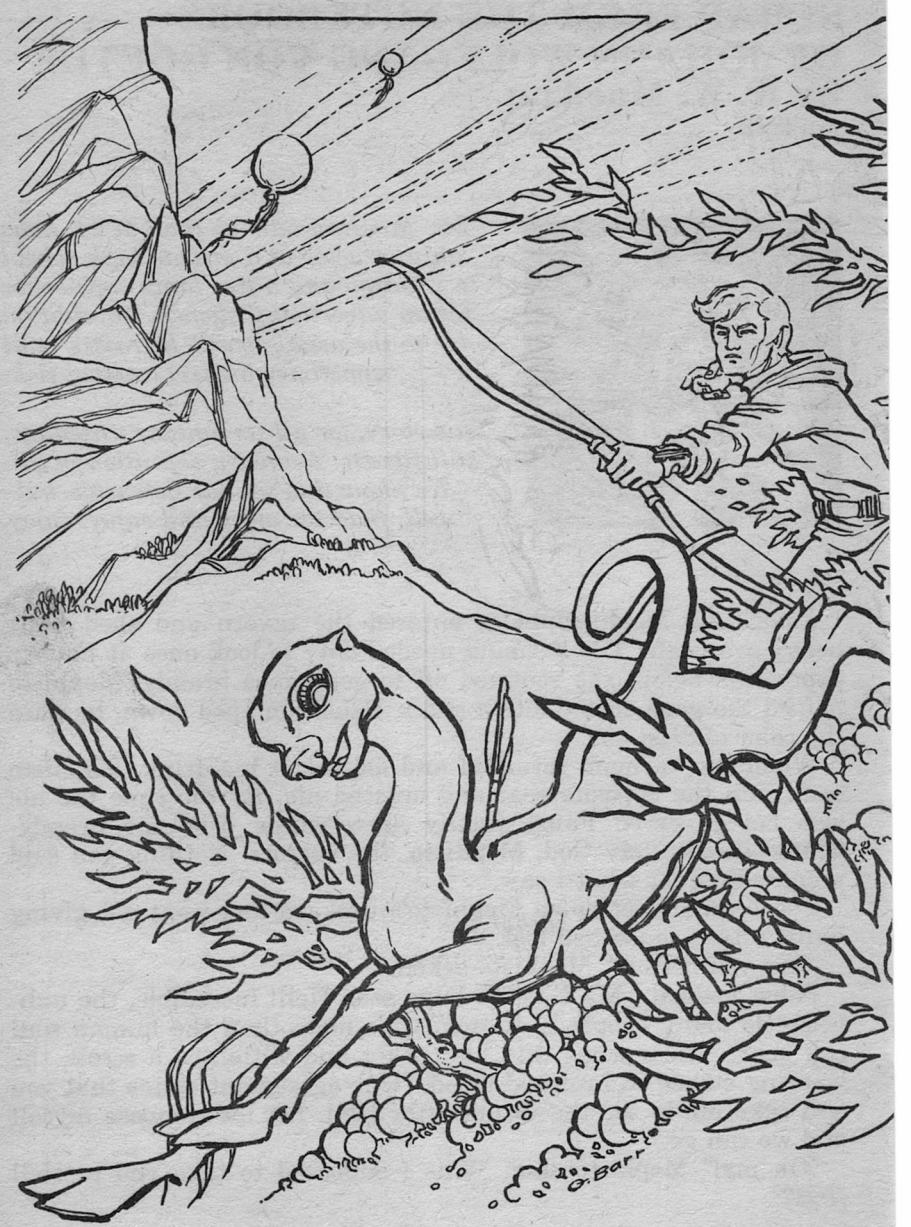
When the barmaid returned and fed Faust his drink, Mephisto sank into the opposite seat and ordered ale. By the time the ale was being served Faust finally drew words from his brandy-hoarse throat. "My God, Mephisto, the horrors! Nothing you said prepared me for what I saw."

The barmaid set down Mephisto's tankard and went off, giving Faust a last, concerned look.

"Are you better?" Mephisto asked.

Faust nodded. "My God! To have seen Hell! Incredible, the ugliness—so many people in torment! It's more than the human soul can bear." He reached into his pocket and withdrew a scroll, the wording etched in browned blood. "Our agreement states that you will take me to see the future after Hell. Let me compose myself and we can go."

"Oh my!" Mephisto said. "Was I supposed to take you to Hell *first*?"


G. Barr

SEASONING
by Hal Clement
art: George Barr

The author has been a bomber co-pilot, a special weapons instructor, a teacher of chemistry, and an occasional painter of astronomical subjects; but it's his science fiction, which he's been selling since 1942, for which he's best known.

For several years I have been playing with the astronomical possibility, which seems to me quite a good probability, that there are numerous bodies a little too low in mass to be real stars and a little too big to be planets—if only because the old definition of planet says that it doesn't shine by its own light. Such a microsun might last a long time, especially if it contained a reasonable amount of heavy radioactives, and warm *one or more satellites even if it didn't* light *them very well. If such a body orbited a more normal star as Jupiter orbits Sol, interesting complications would arise for the satellites.*

When Harlan Ellison put in his emergency request for a planet with interesting details, to present to a group of authors onstage at UCLA so that they could cook up story ideas in public, I already had a good deal of background ready, therefore.

The sun of the system is Castor C, a red dwarf eclipsing binary that we already know a good deal about, and a flare star to boot (just to provide more variation). Medea is a basically Earthlike satellite of a superjovian body which I had already worked out. Locked rotation gives a side heated by Argo, the superjovian, and a cold side heated intermittently by the Castor C suns. A tilted orbit plane supplies regions of alternate permanent light and dark like Earth's Arctic and Antarctic regions. I did the arithmetic on all this, and passed it on to Poul Anderson, Larry Niven, and Fred Pohl, who fleshed out my astronomy. I won't give all the details here; you'll read some of the stories which have resulted in this magazine, maybe some in others, and—eventually—all of them in a nice big book, Medea: Harlan's World, *which will contain all the figures, arguments, and what have you from the UCLA meeting.*

Hal Clement

The onshore wind had slackened, but was still strong enough to make the sturdiest bushes lean inland. The little sloop should be able to beat out against it, but Faivonen couldn't help watching. The *Fahamu* was his only link with the rest of Medea's humanity—a small population, but the only one that could mean anything to him now. Earth's billions were no longer part of his life.

Sullivan had promised to be back by midsummer, thirty Medean days from now. Faivonen trusted him, of course, since unreliable people had been pretty well combed out of the colony's leadership, but any commitment on the new world carried the unspo-

ken qualification, "If I'm still alive." In spite of the numerous children, there were very few more human beings on the satellite than had landed two decades before. Learning as much as possible as soon as possible about the new world was admitted to be a necessity for the colony, but had been hard on individual members.

Faivonen, though his enjoyment of society had died with Riita, had not become a misanthrope, and he could not bring himself to turn his back on his vanishing friends just yet. There would be plenty of loneliness, not mere solitude, for the next couple of thousand hours, even with Beedee along.

The vessel was getting hard to see, but he could make out that she was going onto the starboard tack, after a long reach which had carried the individual figures of her crew well out of sight. The light was dim, probably dim enough to have made him give up the watch thirty years before; but the human eye is adaptable, and the human memory constantly edits the standards of what can be expected. Even though the principal suns were not up yet, their location below the horizon revealed only by flecks of hydrogen crimson from their vast halo of prominences, Castor A and B were nearly overhead. Together they provided less light than Earth's full moon had done, but it was enough to satisfy him.

"They'll clear the bay on the next tack." The voice was only slightly filtered by the speaker in the man's left ear; it would have sounded perfectly human to anyone not acquainted with the being who had spoken, who could hardly have been less so. Faivonen, without even glancing down at his arm, nodded.

"That was my guess. Are you making a linear extrapolation, or allowing for wind changes?"

"The wind will grow weaker for hours yet. Of course I allowed for that." There might have been indignation in the voice. "I have no reliable information on the currents, of course, but with no river flowing into this bay they should be simple. Are you going to watch the ship out of sight? That will waste valuable hours."

"I'll watch for a while. There's no use getting started until the real suns are up, and there's nothing to check before we go. You wouldn't have let me forget anything important, and even if you had there'd be nothing that could be done about it now."

The voice made no answer; its owner knew it had taken the man's thoughts away, to some extent, from his vanishing companions. Faivonen, however, had little else to think of for the moment. The job ahead was already planned in as much detail as

possible; it was to stay alive and to learn what he could about as much of the area as he could cover—preferably, but not quite necessarily, in that order. If he didn't actually manage to stay alive, the things he learned could still be useful as long as his body and Beedee were found. It was this fact that had gripped his thoughts for the moment—the fact, and the memory it always evoked. He himself had found Beedee on Riita's skeleton; he had been searching for her, against the best advice. Success had made him for a time almost useless to himself, to their children, and to the colony. This time, he had extracted a firm promise from Sullivan: if Faivonen himself should fail to reappear to meet the ship, and it was decided that someone must go after Beedee and the information, it was not to be any of his and Riita's children. It was all right if they turned out to be explorers when they got old enough—as they nearly were, he suddenly reminded himself—but that sort of picture was too much to inflict on anyone of closer status than casual friend. The kids couldn't—

"Watch the ship, if you must, but get your mind off that line," Beedee's voice cut into his thoughts. "If you have nothing more constructive, or less destructive, to do than brood, I insist on getting started. The suns are practically up."

This time Faivonen did glance down at the object strapped to his left wrist. He knew that Beedee could not actually read minds. He—or she, or it; the man had vacillated about the correct pronoun for most of the twenty-four years since he first met Riita and her strange possession—could do a very good job of reading the expression of anyone it knew, however. During the twenty years of their marriage, and the year since he had found and inherited the black diamond, it had plenty of opportunity to get to know him.

"You're in no position to insist on anything," he pointed out, as usual when one of their conversations reached this point. Beedee made the usual counter.

"Very true, but you know I'm right. We can see well enough for research. Get the rest of your equipment on, and let's start."

"I'm hungry."

"Well, you won't eat anything but cheese until you get moving. You managed to kill one meal here at the shore an hour after we landed, but nothing else has—"

"All right. Hiking is easier than arguing." Faivonen attached knife, shovel, canteen, cheese incubator, shoulder pack, bow, and quiver to various parts of his person. Then he took a last look at

the *Fahamu* silhouetted against the dull red patch on the horizon where Argo had set a few hours before, turned his back on the bay, and set off up the valley.

From the sea, this had looked like a product of glaciation. No one had been surprised, since it led toward the cold hemisphere. However, there had been no sign of any stream or river flowing into the bay, in spite of the heavy vegetation which could be seen from shipboard. The plant life itself was a little startling for the latitude—eighty-six degrees north of the equator—where Castor C gave very little assistance to Argo in heating the world. When a careful check failed to show even a cove where a seasonal stream might have emptied, it was agreed that information was needed. Elisha Kent Kane Faivonen drew the job of getting it.

A few facts had been ascertained before the ship had hoisted sail. There were animals which could serve as food, and plenty of the plants whose sap would serve as culture medium for the "cheese." This was the mixture of gene-tailored bacteria which produced the half-dozen amino acids needed by human beings and lacking in Medean life forms—one of the very few products of advanced Earth technology which the colonists had retained. They had not wanted to be dependent on anything which had to be replaced from Earth, but had little choice in this matter. Terrestrial plants were still struggling to become adjusted to the satellite, and until real crops of these could be grown, people lived on native food and cheese.

Faivonen kept well to the left wall—his own left—of the valley as he travelled away from the bay. This would get the better light when the suns were a little higher, and they did have to see. Everything had to be examined; plants, animals, soil, rocks, wind, weather. The wind had been blowing on shore and up the valley for days before the *Fahamu* had reached the bay; a surface wind blowing toward the cold side of Medea was another peculiarity to be explained, though the explanation might be as trivial as the explanation of local weather so often was. Beedee had claimed a special interest, however, and was constantly asking the man to hold it as high as possible so that its delicate pressure senses could record air currents with a minimum of ground disturbance.

Faivonen didn't object, usually. The black diamond weighed only about three quarters of a kilogram, a negligible fraction of the equipment he was carrying. Whether the thing should be called equipment or personnel was still an open question, of course; he knew it was of artificial origin, but could not bring

himself to regard it as merely a computer. It said too many things which smacked of personality. Somewhere in the lattice of carbon atoms which formed the thing's basic structure was a tendency—programmed, grown, or learned—to imitate human speech mannerisms and even voices. When he had found it with Riita's body it had spoken to him with her voice. . . .

They had reached an understanding on that, right away; Beedee had promised not to repeat the offense. Courtesy? Sympathy? Faivonen couldn't know, but also couldn't help thinking of the device or creature as a person, as his wife always had.

Of course, a person is alive, and living things don't operate from such simple energy sources as the flow of heat from a man's forearm to a near-freezing environment, or the potential difference between two metal bracelets with human sweat as an electrolyte. Living things, when their energy sources vanish and they stop operating, don't start up again after indefinitely long periods of time.

Beedee had been "dead" for over two years between Riita's death and Faivonen's discovery of her body. He(?) had been "dead" for over two billion years between the time he(?) had sunk with a surface vessel on the Earthlike world of his(?) makers, and the time he(?) had been discovered by Riita's grandmother on an airless planet, blistering under a red giant sun, in a pile of calcium oxide which had once been a deposit of marine limestone.

Only machines can be turned off and on, so Beedee must be *it*, not *he* or *she*. So Faivonen's experience insisted—most of it.

"Elisha! There is a fairly large animal beyond the bush—thirty meters at two o'clock. You're hungry; get ready!"

They were two kilometers from the bay, and the man was even hungrier than when they had started; his bow was bent and an arrow nocked before the diamond had finished speaking. Silently, avoiding the ankle-high puffballs whose bursting would give audible warning of his approach, Faivonen stalked toward the bush. He was still a dozen meters away when a calf-sized creature with six legs leaped into view on the far side, clearly bent on departure. He put his arrow high in the trunk, between the first and second pairs of legs. If it were like the animals he knew closer to the equator, it had no centralized heart; but a major aorta ran along its body just below the backbone. Severing the blood vessel or the major nerve cord should be equally effective. It was; the creature dropped on the next bound.

Faivonen performed a combined butchering and anatomical dis-

section, with Beedee recording the data. Then he collected fuel, lighted a fire with pyrite and steel, and cooked a meal. He didn't enjoy eating it much; neither the Medean flesh nor the cheese was particularly tasty, but hunger was even less pleasant.

He cut a couple of kilograms of the meat into thin strips for his next few meals, extracted the few remaining lumps of ripe cheese frm the incubator's tank and put them in the storage chamber, refilled the tank with sap from the Cheddar plants he had already identified, and resumed his hike, after asking Beedee if his(?) own battery needed charging.

"Oh, no—I'm running on—oh, you're being funny. Excuse me."

It had happened before. The diamond's calculating processes, or reasoning if that was really what it could be called, operated at electronic speed; it had known he was joking long before its first word had been uttered. Nevertheless, it had imitated a human double-take; it had been playing up to his humor. Whether it had felt anything corresponding to the strange relay-chatter with which the human nervous system responds to incongruity was something Faivonen couldn't guess. Whether it *felt* at all was an equally open question.

By the time the Castor C twins were halfway around to their midday position a few degrees above the southern horizon, Faivonen was tired; even with frequent pauses to examine biological or geological data, they were more than thirty kilometers from the sea. He rested and ate again, and then settled into his sleeping bag. He knew that his own biological clock would never reset itself to Medea's seventy-five hour rotation, but sleep was as necessary as food; he slipped the blinders over his eyes and relaxed. Beedee would guard; it was unlikely that anything could approach without registering on its supersensitive pressure sense. Guarding might be necessary; Medean predators could get no more adequate nourishment from human tissue than the other way around, but none of them seemed to know it.

This time the man was lucky, not waking up until Beedee's voice began hammering "Eight hours, loafer," into his ear. He sat up, slipped the pads from his eyes, and looked around. The suns were almost in the south, now, just above the spot where Argo had long ago disappeared. Two balloons floated a hundred meters overhead; Beedee might not have heard them, since they always seemed to ride with the wind, but it didn't matter. No one knew much about the organisms—Faivonen wasn't even sure whether they were actually inedible, or merely had too little tissue to be

worth hunting—but they were certainly harmless. At the moment they didn't seem to be moving at all, which was interesting.

"Sullivan thought the wind was getting a little weaker each cycle," Faivonen remarked. "It looks as though he was right."

"He was," agreed the diamond. "There was a pretty good chance of it when he was speaking, but there were too many unknown variables for real computation. You know, I am beginning to suspect that some of the variables lie in the shape of this valley. We'll have to get a long way inland to make sure."

"Too far inland and Argo won't be rising at all. I want no part of Coldside," Faivonen pointed out. "You wouldn't like it either. There may be a lot to learn, but with your power off you wouldn't be learning it."

"You could rig me a battery. I can think of ways you could set it up to operate even at dry-ice temperatures."

"It gets colder than that—and you don't like being turned off any better than I'd like dying, even if you can switch on again."

"I know. I hate to miss arriving information. Still, I believe right now that I'd like to take the chance; and I've heard you, and Sullivan, and many other people say that danger gives spice to existence."

"I think we said life, not existence. And I know we said danger, not suicide. Forget it, Beedee; you stay with me, and I stop a long way short of dry ice even if this valley goes that far. You figure out what you can from the rocks and the weather and the life; that should be enough."

"There is never enough. I can calculate, but then I have to see whether I was right. You should allow for that; your wife always did."

Faivonen's silence was pointed. A human being would have been embarrassed at the *faux pas,* but Beedee didn't make such mistakes. He must have had—*it* must have had a reason, and it must have been a good one.

The man knew that he probably wouldn't be able to guess it. The score of black diamonds which had been brought back by the Tammuz expedition had made no secret of their composition, though the knowledge had done human engineers no good—the techniques needed to make one of the things were far beyond current human ability.

They were just what they were called—diamonds, structures of carbon with replacement atoms and crystal defects built deliberately into their lattices in ways which resembled mankind's oper-

ations on silicon chips for the last century or two—resembled them in much the same way that the circuit chips resembled a flint knife. About twelve hundred unit cells of the diamond lattice composed a single basic structural unit of the devices; a much less reliable estimate, usually guessed at about five thousand, of these units had about the recording and decision-making capacity of a single human brain cell.

The things themselves—Beedee was typical, though no two were identical—looked as though someone had made a cylinder of black glass a little over six centimeters in radius and not quite ten in length, fitted the ends with hemispheres of the same material, and split them lengthwise to make two units. With that volume—a little over two hundred milliliters—they had theoretical capacity for the equivalent of not quite 200,000,000 four-billion-cell human brains. Some people were afraid of them, and there had been loud demands—to destroy them or get them off Earth—by some of that planet's more paranoid inhabitants. It had not been entirely the high regard for private property rights characteristic of the culture of that time which had allowed Beedee to come to Castor.

Faivonen himself was no more afraid of the thing than his wife had been, but he took for granted that it could think many times faster and with far more precise consideration of myriads of variables than any human being could. It had been one of Beedee's fellow machines, or beings, who (which?) had proved that chess was as trivial a game as tick-tack-toe.

Some people had not forgiven them for that.

Faivonen didn't go back over all that, consciously. He merely wondered why Beedee had mentioned Riita when it knew the man would be pained, assumed he would not be able to guess the answer, and turned to the day's work. He cooked and consumed another meal, loaded up his equipment, and not until they were under way did he speak to his computer-recorder again. Even then he changed the subject to one of more immediate importance.

"There's still no river in this valley—"

"There could hardly be one at all, if none reached the sea," Beedee pointed out.

"There have also been no pools or puddles, though there is plenty of vegetation. I'm halfway through this two-liter canteen. Have you any practical suggestions?"

"There was snow visible at the top of the cliffs from the sea. The temperature here is distinctly above freezing. Some water

should flow over the edge, if only occasionally. Let's examine the base of the cliff more closely; the geological information will be useful in any case."

Faivonen refrained from comment, and started toward the nearer side of the valley. They had already learned that the valley had been cut in sedimentary rock—a fine sandstone—whose present elevation above sea level implied much about the tectonic forces available on Medea. There was rubble, inevitably, at the foot of the cliffs. Near the bay, this had been deposited so as to give a U-shaped contour to the valley, leading the explorers to assume former glaciation; closer examination had revealed only very fine material which appeared to have been wind-borne. This far from the bay the roundness persisted and was even exaggerated; the cliff, on this side at least, seemed slightly undercut.

Away from the walls, the soil was a fine-grained loess. Closer in, it contained rocks whose size increased with decreasing distance from the cliff. Exposed portions of the rocks were well rounded by some form of erosion.

The soil itself was very dry, in spite of the abundant vegetation. The man had dug up several of the smaller plants, and found that their root systems did not go particularly deep; Beedee had agreed with his conclusion that there must be a fairly frequent supply of surface or near-surface water, since the plants themselves showed nothing unusual in the way of liquid storage capacity.

The diamond, as usual, was right; the soil was detectably moister near the cliff, and part way up the slope they found occasional shallow puddles where the rocks had made dams to hold them. With a good deal of relief, Faivonen took the first long drink he had allowed himself since landing, and refilled his canteen.

He was in a better humor now, willing to go on farther toward the cold. His garment was another bit of Earth technology which had been kept for special uses, a coverall of thin polymer whose thermal conductivity was extremely low, though it was quite transparent to near infra-red radiation—he could appreciate the heat of a fire or of the Castor C twins without having to take off anything to let the light in. With a headpiece like an ancient skiing mask, he would be able to face air temperatures well below the freezing point of water, even with fairly high winds. Dry ice temperatures would be something else, but it should take many days of foot travel to bring him anywhere near that sort of environment.

He chatted good-naturedly with Beedee as they resumed their

way up the valley, slanting back toward its level floor where walking was easier. The discussion was almost entirely about the facts they were observing—the diamond was seldom willing to play human to the extent of indulging in gossip or idle chatter—but it included much speculation. What had elevated this entire region of sedimentary rock practically as a unit for more than five hundred meters? Beedee had made several dip measurements where the exposure permitted, and nowhere found more than two degrees. What had cut this canyon, if not a river or glacier? and if it had been a river or glacier, why was there no trace of it now? Valleys without central streams are most unusual except the ones in deserts—and even those usually have empty stream beds where water once flowed.

The two balloons had drifted *down* the valley—the wind had finally reversed, instead of merely slowing down. Could this be a tidal phenomenon, as Sullivan had guessed as they were approaching the region in the *Fahamu*? Beedee agreed that it could be, but declined to risk a prediction.

"If this is really a tidal current in the atmosphere, and is being funnelled into this valley from both ends, the width of the valley itself, the height of the walls, and the size of the feed areas are all relevant. At the sea end the supply reservoir is effectively infinite, but we have no observations about the other factors. Guessing that the canyon keeps its present width and height for its whole length is pointless as long as I don't know the length or the other variables. I can treat it mathematically as an organ pipe of rather unusual cross section with a forced input of one Medean day's period, but—"

"Forget it." Faivonen was a perfectly good mathematician as human beings went, but knew the futility of trying to follow Beedee's brute-digital-force "estimates." "You keep your ideas inside, and we'll check their accuracy as we get farther up the organ pipe. Isn't that a new plant?"

"Not really. It's quite common on some of the islands near the equator. It is the first time I have seen it so far north. Of course latitude means much less than longitude here as far as climate is concerned." The last sentence came after a slight pause, as though it were an afterthought.

"Yes, *I* keep forgetting. It was very tactful of you to talk as though you forget too, but I don't really need that kind of coddling. I know what your brain is like."

"Does it offend you? I have noticed that most human beings

seem more at ease when I use such conversational artifacts."

"Well—no, not really. Just don't ever let it waste time if we're in trouble."

"Of course not."

Whatever Faivonen may have thought consciously of Beedee, his feeling toward the thing was essentially ordinary friendship. It was a personality. It was even a person. Their running conversation might almost have been taped at a dining table during a scientific convention; and for the first two Medean days it was little more exciting than dining-table talk. The only complications arose from the endless phase problems between Faivonen's twenty-four-hour cycle and the satellite's seventy-five-plus-hour rotation. He had to waste waking hours at "night." The white suns and the continuous aurora gave enough light to permit travel when the orange suns were below the horizon, but the man and the machine were both reluctant to do this. Seeing was poor enough to give a high risk of missing important data, a possibility which bothered Beedee even more than it did the man. Gathering and storing information was the diamond's prime motivation—its equivalent of hunger, thirst, and libido combined.

On the third day, Faivonen was awakened early from his morning sleep by Beedee's voice in his ear.

"Elisha! Something is trying to creep up on us very silently! Have weapons ready."

The man snaked out of his sleeping bag as quickly and quietly as possible. "How far away?" he asked, wondering whether bow, axe, or knife would be most appropriate.

"I cannot tell the linear distance, since I don't know how much sound energy it is producing. If it maintains its recent average rate of approach, it will arrive in about one hundred seconds."

Faivonen was on his feet by now; he nodded, seized the bow, and nocked an arrow. "Direction?" he asked.

"Four o'clock from where you're facing now." The man whirled to his right. Nothing was yet visible, but there were many shrubs up to three meters in height which blocked the line of sight. He could not hear anything yet; the hard-packed soil was almost completely covered with the bladder-covered, mosslike growths which filled the ecological niche of grass over much of Medea's surface, and even a very heavy animal would have made little noise.

Argo was just rising, and its dull red disc, rimmed on the upper left by the brighter crescent where the twins lit its farther hemi-

sphere, provided a blood-tinted background against which the newcomer should be silhouetted any moment. Faivonen wondered whether the creature were following his trail, or had simply winded him—the air tide, if it were actually that, had gone much more negative during the last couple of cycles and blown a stiff breeze down the valley toward the sea. This had fallen in the last few hours as the fire-planet rose, but could still be carrying the human scent to anything down-valley equipped to detect it.

"It's stopped. It's only breathing now," Beedee said suddenly. Faivonen lifted his bow, and drew the arrow part way back. Some of the Medean predators could leap many meters—

This one didn't. It suddenly came into sight to one side of a large bush, running toward him at high speed. It was moving too fast, and the back-lighting was too poor, to let him count legs or spot other details; but research didn't occur to him until later, anyway. He drew the shaft back the rest of its length, aimed as best he could in the second or two available, and loosed. The creature swerved slightly, knocking him off his feet as it brushed by him. It must have had twice his own mass. He struggled back to his feet as rapidly as his muscles would permit, dropping his bow and drawing his machete.

"Relax. It's still running. Your arrow is about half-shaft deep in a front left shoulder; you hurt it badly, perhaps killed it."

"Any other details?"

"It was a species of lancer, the largest I've seen. It had a radula—the toothy-tongue arrangement they all do, and was running with tongue extended. If you had missed with that arrow, the tongue would have hit your throat and left very little of your neck. I thought of telling you to dodge, but it was obvious that your reaction would have been very much too slow."

"And it's still heading away from us?"

"Yes. I see no likelihood of recovering your arrow."

"That wasn't quite what I was thinking about."

At least, the incident killed boredom for a time. The diamond claimed not to understand this, pointing out that if Faivonen had been killed he would have attained ultimate boredom. Faivonen failed to see any humor in this, but couldn't help wondering whether Beedee were actually trying to display some such human emotion. He put a leading question.

"Do you really want all your predictions fulfilled and your calculations correct? I've heard you say that your fun consists of checking your figures against observation. Isn't it sort of—well—

deadening if you're right all the time? Life needs some kind of spice."

"I assume you speak figuratively, if the word you just used actually refers to the taste-only foods you left on Earth. I am aware that no research can be done without a little risk, but fail to see how adding to the danger improves the taste, if that matches your figure of speech, of learning or discovery."

"You're just trying to make yourself sound more like a machine," retorted Faivonen.

"Gambling should obviously be saved for the time the odds are with you. My knowledge of human gamblers is limited, but manipulating the odds in their favor has always appeared to be one of their standard procedures."

"Those weren't gamblers. Look—you've just won a bet, since your existence is tied in with mine. If you don't get a kick thinking about that, you're just not alive."

"I have never claimed to be alive," was the diamond's rather overwhelming answer. "Thank you for forgetting."

Faivonen could think of nothing to say.

There was no more night, even the brilliant night of aurora and the white Castor suns. The trip had started at the equinox; four Medean days later, sunrise and sunset points had met ahead of the travellers. The Castor C twins were in the sky for the rest of the journey; they would not set for thirty of Medea's revolutions around Argo. This at least resolved the question of whether or not to travel at night.

No more attacks were experienced in the next few days, and boredom again began to threaten the morale of the human member of the exploring team. On the seventh day he felt the need to do something about it.

Beedee, with its precise visual sense, had measured the distance they had travelled, mapping the valley as exactly as the human race was ever likely to find necessary. They were now just over five hundred and fifty kilometers from the bay as the balloons travelled—as many of them did. The winds were increasing in speed both ways, and more and more of the organisms were apparently getting swept into the valley. The down-valley winds, back toward the bay, were less intense and shorter in duration than those blowing from behind the travellers, but a change in both qualities was becoming evident as the days went on.

"Beedee," Faivonen remarked as he finished a breakfast during the seventh day, "I'm getting a little tired of waiting for some-

thing to happen. I was inclined a couple of days ago to liven things up—season this meal of knowledge you find so tasty—by making a bet or two with you. Then I couldn't think of anything either of us could use to pay off with; but I just have. The only trouble is that I'm not sure any bet could be really fair, since you can calculate things so much better than I can. Still, it's worth trying, if you'll tell me the truth."

"Trying what? Why should I tell you anything but the truth?"

"To the latter, I don't suppose you would; it would demand human characteristics you claim to lack. What I want to try, as I said, is a bet. For example, I've been wondering about those balloons—they're being carried farther toward the cold side than back this way by the winds, so far. If they get there, it's hard to see how they could do anything but freeze. We could bet on how much frozen balloon there is in the glaciers we both believe are a few hundred kilos along, with the uncertainties being things like natural methods of escape which I haven't been able to think of.

"Or we could bet about the winds, which we both think are affected both by the season and the tides. How intense will they get by, say, the third noon from now? I can only extrapolate roughly, and you say your calculations wouldn't mean anything without data on the shape and length of the valley and the area beyond which feeds wind to it."

"True. My set of possible solutions so far is so broad that any one of them would qualify as merely a guess. Yes, we could bet on that; but what possible currency could we use?"

"If I lose, we go fifty kilometers farther than the point where my judgement says we ought to start back. You will collect that much more knowledge."

"A very tempting offer. Will you state in advance the criteria on which you would base that judgement?"

"Don't you trust me? I can give you several, actually, but can't guess which might happen first or demand highest weight. For example, if we went twenty hours or so without finding a food animal, I'd certainly think about return. If wind-chill got too close to the lower limit at which this suit could keep me alive . . ."

"But if we went beyond those points, you might die. Those are the same sort of factors which would make *me* recommend turning back."

"Well, that would be just another bet. If I didn't survive, you'd still be found sometime, so you'd be the winner again."

"I don't want to be turned off, even temporarily. I wouldn't re-

gard it as a win."

"And you won't bet?"

"No. What are you trying to arrange? You haven't suggested what I should pay you if you win. I have never heard of a gambler who didn't give that factor his prime concern."

"I told you—you've never met a real gambler. I'd be content with being right in a dispute with you. Didn't Riita ever challenge you to anything like that—both make predictions, and see who was right?"

"I thought you didn't want to discuss her with me. It seemed to cause you grave emotional distress."

"This is not a discussion. I simply asked a question."

"Yes, she sometimes tried to outguess me about what was to happen, but she never made a formal challenge of it."

"Well, I want to."

"I get the impression that you are trying to confuse me. The set of possible explanations—or rather, the set of explanations I can think of—for your action is larger than the set of possible solutions to the problem of the valley wind."

"I have thought of something you could pay me. Just stop with those artifacts. The correction in your choice of words was intentional; you had planned that sentence long before the first sound wave came out of the speaker."

"You said that this did not bother or annoy you."

"It's beginning to. It reminds me, each time you do it, how much faster your brain works than mine does."

"Then I will stop. No bet is needed."

"Thanks—I guess. Well, I'm making a prediction anyway. I say that the wind coming down this valley at noon on the third day from now will have a speed greater than seventy-five kilometers an hour. Do you agree?"

"This is very close to the median of my set of possibilities."

"What's the median?"

"Seventy-seven point one four."

"All right, I say it will be higher than that—or do you want to take the high side?"

"I see no basis for a choice. Let it be as you say. I will not, however, hold you to the pledge of extra distance if you turn out to be wrong."

"You can't stop me from paying off if my conscience demands it," pointed out the man.

"You mean you are doing all this to remind both of us that you

control all our actions? It seems silly."

"I hadn't thought of that. Thanks."

"I wonder if that is really true."

Faivonen made no answer, though the diamond's remark startled him considerably. He fell silent, and gathered up equipment in readiness for the "day's" next hike. The suns circled the horizon, hiding first behind one set of cliffs and then the other.

Some ninety hours later the trip became interesting again without the aid of bets. Over a space of about two kilometers the hard soil of the valley became first slightly damp, then quite wet, and finally coated with frost. The man's first thought was radiation cooling, even though there had been no real night. Then he noticed that the frost extended about equally far on both sides of the valley, and part way up its walls, as though something had come down to this point to chill everything, and then retreated. The fact that frost crystals grew as deeply on the underside of branches and overhung rocks implied the same: things had cooled by some other process than radiating to the sky.

"This is a good one," Faivonen remarked aloud. "Any ideas?"

"Of course," replied Beedee. "This fact has narrowed my set of possible solutions by more than ninety-five percent."

"Where does it leave my bet?"

"You are well ahead. You are also in about fifty times as much personal danger as I had estimated."

"How bad is that? You mean we should turn back now?"

"I should be able to give you warning. Actually, the estimate remains grossly unreliable in view of the unknowns in the physiography ahead of us. If you are willing to face the risk of learning more of the pertinent facts, I most certainly am."

"But what caused this frost? And why is it taking so long to melt, even with the suns shining on it?"

"Before I answer that question, I must ask you one—one which involves your wife. Do you object?"

Faivonen hesitated, then said, "Go ahead."

"It was her very clearly expressed wish that I not solve a problem for her which I believed she might reasonably solve by herself. She may never have told you in so many words, but she did not wish to become dependent on me; she felt some guilt about bringing me to Medea at all. She fully supported the policy that you colonists should not be or become dependent on anything they could not produce here. If you share her policy views, I cannot answer your question. I know you have enough data, and I think

you have enough reasoning power, to solve it yourself."

Faivonen thought silently for several seconds. He was willing to take on the problem himself—it would help fight the boredom of pure fact collecting. However, he was less sure of the general policy suggested. Beedee, in spite of the need for independence, was highly important to the colony; it carried most of the data so far accumulated about Medea in its memory. Some of the group had objected to letting the device go out on exploring trips, yielding the point only because so much better quantitative information could be obtained through its senses. Several of the *Fahuma's* crew had been clearly more concerned about the machine than about Faivonen when they left the ship.

If, as Beedee had just said, the danger were now greater, perhaps it would be better to turn back now and get the information so far gathered back to the colony.

On the other hand, as he was quite sure the diamond would claim, what they had learned already would be greatly multiplied in value if more were known about this area; the local meteorology, especially, would provide clues to the cold-side conditions which might take years to gather any other way or from any other place. It was not just a matter of Beedee's burning thirst for information; Medea's weather, and still more its climate, could be very literally matters of life and death for Medean humanity. There was no way of getting knowledge without risk, and knowledge itself was life.

"All right," he finally said. "I'll figure it out myself. Let's go on." Beedee approved briefly.

The suns were slowly melting the frost from the branches and leaves of the bushes, but were making much less progress with the coating on soil and rocks. The presumption was that the latter had been chilled to a considerable depth, which in turn suggested conductive rather than radiative loss of heat; beyond this, for the moment, Faivonen could not get. The only change made by ten kilometers of travel was a thicker frost, with some evidence of snow as well—piles of feathery crystals which had apparently blown into sheltered areas by wind coming down the valley, and then, strangely, had had frost crystals grow on top of them. The distinction between the material which had blown from elsewhere and that which had grown in place was quite definite, according to Beedee, and Faivonen himself could see it.

He could not see the physical situation which would produce such a phenomenon. There had been no clouds even a few

kilometers down the valley; it was hard to see how snow could fall without them. On the other hand, it was hard to see how radiation cooling sufficient for frost could occur if clouds were present. A brief snow shower, possibly, followed by a quick clearing, would explain things after a fashion. However, it did not explain why he and Beedee had seen nothing of the shower. Such a phenomenon should have been part of a travelling system—a weather front; and why such a thing should have stopped and retreated, or died out after coming within a few kilometers of the last camp, was hard to see. There had not been a cloud; all that either of them had seen in the sky since the suns had stopped setting had been the balloons.

These had been floating in ever-increasing numbers, sometimes back toward the bay, sometimes passing the explorers on the way toward the cold side. The tides, if the valley winds really were tidal phenomena, still seemed to favor motion away from Argo.

The creatures seemed to be drifting lower each day. A hundred hours ago some had been only a few tens of meters up; now many were practically skimming the frost. It occurred to Faivonen that he might actually catch one of the things by its trailing roots, or tentacles, or whatever they were. Then it occurred to him that the converse was also true. However, he refused to worry, as usual.

"I suggest," Beedee cut into this line of thought, "that we examine some of the clefts or chimneys in the cliff. We might get more evidence about the nature of this strange heat sink."

"All right," agreed the man. "While I'm climbing, you might look out over the valley for animal life. We're short of meat, and I can't live indefinitely on cheese. I can't help wondering whether this freeze may not have driven the local animals away, or into underground hibernation, or something like that."

"A good thought," agreed the diamond. "It would be a pity to have to turn back just as data are starting to cut down the possibilities to a really manageable set. I predict that the valley will at least double its width in the next ten kilometers."

"I'll go that far without any food, if you're that near a solution. But let's check this chimney first."

The feature in question was a fairly typical crack, ranging from one to two meters wide, in the cliff wall. It appeared to start at the point where the rock itself became nearly vertical; probably it went lower, but was hidden by the rubble which formed the rounded base of the wall. A climb of nearly a hundred meters was necessary to make the study they wanted.

This took only a few minutes. The numerous projecting rocks which served as steps were worn very smooth, presumably by blowing dust or sand, but were so firmly buried in loess as to be completely safe. With frost crystals crunching under his feet, Faivonen took a zigzag path to the bare rock; from that point he was able to follow a shelf where coarser and evidently softer sandstone had been eroded away, straight to the chimney itself.

The examination was brief; the crack was almost solidly choked with frost.

"Not radiation cooling," Faivonen remarked categorically.

"I agree," replied Beedee.

"You know what did it." The man's words were a declaration, not a question.

"I believe I have a unique solution for this aspect of the problem."

"And I should be able to find the same one."

"You should. All pertinent data are available to you."

Faivonen thought deeply as he picked his way back down to the valley floor and headed up the valley once more, but failed to come up with any solutions, unique or even believable. Increasing hunger finally diverted his attention from the problem.

"Did you see any animals while we were up there?" he asked the diamond.

"None, nothing moving in any part of the valley I could examine. I did not mention it because you said you would go at least ten kilometers farther anyway."

"Thanks. What do you think the chances are of finding them in this frozen area?"

"I have not enough information for a reliable estimate."

"Could these animals survive the conditions which you believe caused the frost?"

"Not by any special physiological machinery we have found in them. Such techniques as hibernation would involve biochemical factors not obvious to gross examination, of course."

"Could I survive those conditions?"

"No."

"But you can warn me in time to escape them."

"I believe so. There are variables—"

"I know there are variables, blast you. Are you walking me into something I'd have to catch a couple of dozen balloons to lift me out of?"

"That number would be insufficient, and you might have trou-

ble securing their cooperation—"

"Cut it out! You know perfectly well when I'm being figurative!"

"I am never certain about it. Your wife was much easier to judge in such—"

"Shut up!"

Faivonen strode on in silence for two or three kilometers. After the first five minutes or so, he realized that Beedee had done a competent job of changing the subject on him, and he still didn't know how much risk he was taking; but he didn't see any use going back to the matter, and he felt reasonably sure that the diamond would not take really serious chances with its own transportation. Gradually, he cooled down to the point where he could pay attention to his business once more.

The frost was slowly vanishing from the near side of the valley, under the rather unimpressive glow of the twin suns—a glow currently reduced by the fact that one of them was eclipsing the other. Argo, the real heat source for its satellite, was too low to help even if a slight turn in the canyon, some scores of kilometers back, had not blocked its radiation from the valley floor anyway.

When he finally spoke to Beedee again, it was not about personal risks.

"How much useful information do you really think we can get by going, say, a hundred kilometers farther, if that is possible?" he asked. "We have a good idea of the local geology—at least, as good as we can get without drilling—and an even better one of the biology and ecology. Of course, any additional information is always good—I go along with you on that, even if I don't have your burn for detailed knowledge—but aren't we maybe getting to the point where what we've already learned should be brought back and reported?"

"In those fields, perhaps yes," was the answer. "However, the meteorology still baffles me seriously. We really must learn more about the atmospheric tides which I believe are controlling so much of what goes on in this valley. If I can work them out in detail, I believe we can infer more about the physiography of the cold side of Medea than could be learned by many hundreds of man-days of surface mapping even if men could venture there. I consider it vital that we go on for a while yet."

"Regardless of risk." It was not a question.

"Not entirely, of course. I will do my best to keep you well enough informed to get us back safely, though like you I accept

the fact that research entails risk. After all, while I was quite certain that you would come looking for your wife and therefore would find me, I am not nearly so sure that anyone would—or could or should, in this part of the world—come looking for you."

"They'd surely come for you."

"I doubt it. Sullivan would be the most strongly tempted, but would certainly not leave his ship. I would not be willing to bet my consciousness on the chance of anyone else on the *Fahuma* coming, even if Sullivan were willing to work such a trip into the ship's schedule. I am as strongly concerned about your safety as I was about—" The machine's voice broke off.

Faivonen knew what the missing word would have been, just as well as he knew that the interrupted sentence had not actually been a mistake; it was another deliberate action by the diamond. He decided not to play up, this time.

"All right. We'll go on for at least twelve hours, unless you warn me back. Keep your senses tuned up for animals, please. The food situation is getting a little tense."

Beedee acknowledged the request, and another score of kilometers were traversed with little worth noting except the melting of most of the frost and the fulfilling of Beedee's valley-width prophecy. They finally stopped for rest. There was nothing to eat but cheese, since they had seen no animal life, but he lit a fire anyway; and, with some trouble, dug a shallow sleeping pit in the not-quite-frozen ground. The wind was starting to strain the performance of coverall and sleeping bag; balloons were now sweeping by them from behind at running speed, at times bouncing against bushes.

"Do you suppose it's the low temperature that brings them down this far?" the man wondered aloud.

"Not for simple physical reasons. A given mass of hydrogen or other light gas would have the same lift in a given atmosphere at any temperature. The balloons do not seem to have shrunk, and a temperature drop for a given *volume,* if shared by the surrounding atmosphere, would increase the lift. Of course, if the creatures can alter internal pressure by muscular contraction of their sacks, or do something to raise internal temperature, the set of possible responses is greatly enlarged. A detailed examination of one of them would be interesting and useful."

"Hasn't anyone done it already?"

"It has not been reported to me. The creatures seem to have been given a very low research priority after being found inedible.

I would not have approved, myself, of such an evaluation."

"Naturally not. Well, we'll fit that in if we can. Stay on your toes; I'm going to sleep for a few hours." Faivonen slipped the blinders on.

He woke up five or six hours later, unpleasantly chilled. Keeping as low as possible behind the low pile of soil he had excavated—the wind was not strong, but very noticeable—he placed most of the fuel he had stacked beside his sleeping pit to help break the wind on the remains of the long-dead fire, and lighted it. When it blazed up he rose to sitting position to let its radiation reach more of his body; and as he did so, Beedee's voice—no, it was Riita's voice!—suddenly sounded.

"Elisha! Get to the cliff and start climbing at once! Waste no time!"

Being human, Faivonen did waste a little time. He reached for the equipment he had discarded on lying down, which cost him a second or two; as he ran toward the nearby valley wall, still fastening gear about his person, he looked up the valley and almost lost several more.

Some kilometers away—he could not judge more precisely—an almost featureless white cloud was bearing down on them. It spread low across the valley from wall to wall. Its upper surface was sharply defined, but he could see for some distance into the lower portion. Its height was somewhat under half that of the canyon walls.

From ground level he could .not judge its speed, but had a strong impression that it was approaching rapidly. Beedee's evident opinion that it was dangerous could probably be trusted, anyway, and Faivonen ran his hardest.

It was only a short distance to the point where the wind-rounded rubble began to slow him down. It also, very shortly, brought him to a height where he could judge the distance and speed of the menace for himself. Neither item of information was encouraging. He saw little chance of getting above it before it reached him, but he had no idea of giving up and spending the time before it arrived in thinking up reasons why it was probably harmless.

Details became clearer as the thing drew closer and the man climbed higher. He remembered seeing something like it in a museum on Earth, in a wave demonstration tank where two immiscible liquids sloshed back and forth. He remembered the crawl of the denser fluid along the tank bottom as the container slowly

tilted, and how the lighter material was forced up and out of the way.

He remembered pictures of a similar situation which had seen later, when he was studying meteorology—the cross section of a cold front. . . .

And suddenly he realized what it must be, and redoubled his climbing effort. Cursing his own shortsightedness could come later, when the breath might be available.

"Beedee!" he panted, "I suppose this was your solution. I take it you didn't call the time quite correctly."

"It is. I couldn't. The region beyond our sight must broaden into a bowl in its general arrangements, but I have no data on the bowl's size. Hence, the sloshing of the dense gas under tidal influence has a natural period which I was unable to calculate, though the observed changes in the valley wind eliminated many possibilities. There must be funnelling effects at various places along the valley, and these were quite impossible to calculate. There must be some critical time, as spring advances, when the contents of the bowl not only pour for some distance down the valley but actually start a siphoning effect. I trust this is not the time. When that happens, there will be a high, uninterrupted wind of carbon dioxide all the way to the sea—no doubt the cause of the peculiar erosional features we have observed from the beginning."

"I guessed about the CO_2 when I saw how sharp the upper surface of the gas river was. It's the coldest cold front anyone ever saw—"

"Don't waste your breath in speech. You seem to have analyzed the situation correctly, but you will have to get above that gas surface or drown. You probably see now as well as I do how the thing formed in the first place, but this is not the time to discuss it. Climb!"

"All right. Just don't use Riita's voice again, no matter how urgently you want my attention."

Beedee made no answer to this, and Faivonen continued up the steepening slope, still snatching occasional glances at the approaching river of frigid gas. Its boundary was clearly marked by the water it froze out of the air it met. Tiny snowflakes settled through it, giving the mass a foggy appearance from a distance. The upper surface looked sharp mostly because the man's line of sight was nearly parallel to it.

It was also marked, he saw as it drew nearer, by larger specks which he finally realized were balloons. Their buoyancy, as he

and Beedee had seen, was for some reason low enough to let them reach the ground in ordinary air, but they floated on top of the carbon dioxide to emphasize the outline provided by the snow.

Looking back and down, in the brief instants he dared do so, he could see the creatures being scooped up as the front reached them. They looked as helpless as he was beginning to feel. His arms and legs ached, his breath was scratching at his throat, and his heart was pounding. He was tempted to drop some of his equipment, but it was already at a minimum likely to keep him alive if he got through the present jam.

The front at the valley floor level was within a kilometer of his camp—farther back, thank goodness, at his present height—it had a shallow slope; every meter he climbed was giving him more time—that would be a good calculus exercise—no, waste of time, Beedee must have it figured out already except for a few variables involved in the terrain he was trying to climb over—it was funny what a person's mind would do when it wasn't being put to important work.

Now the ground-level leading edge of the front had passed below him. The valley to his right was floored with a foggy whiteness which became sharper and more opaque as the eye followed it toward the horizon. The top of the snowstorm was climbing toward his feet, the site of his camp disappearing through the thickening precipitation. The fire had vanished between two breaths; its only trace was a vague patch of smoke which had been lifted like the balloons and was spreading into invisibility as it rose toward him.

"Elisha! To your right—ten meters—a chimney. Get into it!"

"Why?" Faivonen slanted in the direction mentioned, even though the reason was not yet clear to him. "It will fill with gas as quickly as the rest of the valley, and there's no reason to suppose I can climb any faster there."

"You probably can't, but I sense turbulence at its edges. The gas is mixing with air there, and should remain breathable longer. Try it. As I read the currents where the front has reached it lower down, there must be good air being forced up from below inside the crack."

Faivonen didn't see what he could lose, and where hand- and foot-holds permitted a choice he favored the way toward the opening. He was by now well above the talus and climbing bare but greatly weathered rock. As had been the case farther down the valley, occasional layers of softer sediments had eroded more

rapidly to provide shelves and steps; the climbing was not essentially difficult, but hoisting his eighty kilograms of self and equipment even with good footing at the speed which seemed necessary called for a high power consumption.

But climbing inside the chimney would be too slow, though he knew the techniques well enough. Beedee saw this, once they were able to look in, as quickly as the man did.

"Stay as close as you can. There'll be oxygen for longer. Another fifty or sixty meters will get us out of danger anyway."

"I—"

"Don't talk! Keep quiet and climb! I'm talking so you won't. Listen all you want, but if you disagree with me keep it to yourself until later. I just remembered another factor; I wish I could evaluate it numerically. The gas lake feeding this river must not only be sloshing under tidal influence, but be expanding thermally as spring advances. It's getting deeper, and would overflow down this valley, I judge, even without the tides. The diurnal variation in solar heating would have the same frequency as the tide, of course, but probably not the same phase—a really interesting new family of variables—"

Faivonen glanced back and down, which was what Beedee had been hoping to forestall. The snowflakes were very close below.

"Twenty more meters should make us relatively safe. There's a good ledge there—"

Cold suddenly bit through the coverall. The rock seemed almost hot by contrast, and he was tempted to press against it and stop climbing. The air coming into his nose felt like fire, and he pulled his mask completely over the lower half of his face. The chill may have helped save him; he could feel the urge to breathe faster as the gas reached his blood, but the pain drove him to inhale as slowly as possible. Hyperventilation, especially in Medea's oxygen-rich atmosphere, could have cost him his physical coordination.

There must be some mixing; he was holding on to consciousness, so there must be enough oxygen—or nearly enough; there was a curtain of darkness twisting about the edges of his field of vision. Beedee was talking again, giving very precise directions where to put his hand, and then his other hand, and then one foot, and then the other . . .

His vision cleared, and his mind slowly followed. The snow was below him again, and he could breathe without pain. He was not, however, out of trouble.

He was on a ledge, presumably the one Beedee had mentioned, and seemed in no immediate danger of falling from it; but there was no obvious way of getting off it by any other method, either. Below, the way he had come, the cliff was climbable but bathed in the frigid gas. Above, the rock was sheer and, at first glance at least, impossible to negotiate. To his left as he faced outward, the shelf came to an end several meters short of the chimney; in the opposite direction it extended farther, but its end was quite visible.

"Is the gas going to get this high?" he asked.

"Not as long as it flows this way. The gas lake, I judge, is now emptying smoothly."

"Then maybe its level will go down as it empties," the man hoped aloud.

"Maybe. I have no basis for estimating its total volume. It seems obvious that it is fed by glaciers of alternating layers of water ice, flowing under pressure even at farside temperatures, and carbon dioxide ice, deposited in alternate seasons. No numbers are available, I fear."

Faivonen got wearily to his feet; there seemed nothing to do but make really sure about other ways off the ledge. Fifteen minutes later he settled to the same spot with a grunt of greater weariness. No ways up, and the only ones down all led into the gas.

"Well, Beedee, I guess I can only wish you luck. Maybe someone will come by in a few years looking for you. I just hope it isn't one of the kids."

The machine responded only to the first sentences.

"Perhaps you could improvise a cell to power me and keep me conscious until then. You have several metal objects in your possession, and if you strapped two pieces of different composition on my round and flat faces respectively, using a strip of leather from one of the balloons, there should be an adequate potential difference. Natural moisture in the tissue should provide electrolyte, probably to very low temperatures—it would be far from pure water. You should try before the balloons blow off the shelf."

Faivonen had paid no attention to the half dozen of the creatures which had apparently been blown into the relatively calm area of the shelf. Even though they were big—some of them over two meters in diameter—it would have taken dozens of them to support his weight even if he had trimmed off their excess tissues and left only gas bags.

"You do want to do a bit of gambling, then? I told you it was the

spice of—let's call it existence, since you don't claim to be alive."

"I don't see it as gambling; I am merely trying to increase my odds of remaining able to observe. You said that wasn't true gambling."

"So it isn't. All right, I'll do my own gambling. There's a bush farther up the cliff, between us and the chimney. I have twenty meters of line, and a climbing grapnel. If I can hook to the bush, I can work across to the chimney with the rope carrying our weight."

"I noticed the bush. It is twenty-seven meters from the nearest point on the shelf."

"Then let's use leather, if you can call it that, from the balloons to lengthen my line."

"I doubt that it could be strong enough; lightness must be its primary quality."

"Right. *That's* what I call gambling."

He rose and approached the nearest of the balloons. It was obviously alive—the rootlike tentacles were moving, apparently aimlessly. It showed no obvious awareness of his approach, and did not react even when he stepped within reach of the tentacles and poked it experimentally with his machete. The gas bag was rather taller than his own height, thin enough to be translucent, delicately tinted pink and orange. The vital organs, if they could be called that—no one was sure if the things were animals, plants, or something entirely new—were clustered in a structure about the size of a human head at the lower end; the roots radiated from just above this, at what Faivonen couldn't help thinking of as the Antarctic circle.

If the thing were really animal in any sense, however, it seemed to be unresponsive—perhaps the cold, the man thought. Deciding it was safe, he squatted down and examined the "head" closely. The roots continued their aimless writhing.

After close examination which told neither of them anything useful, he dissected the central mass rapidly, letting Beedee see everything he did. The organs, their shapes, and their arrangements conveyed no meaning to the man, and the machine cast no illuminating comments although its insatiable thirst for information was presumably being slaked. The balloons, Faivonen judged, must form a kingdom of their own; they showed no clear relation to other life, Medean or Terrestrial.

The tissues of the deflated gas bag were as flimsy as predicted, but Faivonen began cutting strips from them. Rope making would

be a long job, and time seemed limited.

"You will have to make the cord as far overstrength as we can estimate," remarked Beedee. "It is unfortunate that we have no way to test it before completion. How long do you think you will need?"

"Longer than we probably have. I'm hungry and thirsty now; there's little cheese; and, by that time, less water."

"We should have started sooner, but it was impossible. I fear our lack of data has cost another human life, though I tried to avoid my earlier mistake."

Faivonen snapped a startled question. "You mean it was a situation like this that caused Riita's death?"

"Not exactly, though her problem involved the use of the balloons. There were human emotions involved which I had not evaluated properly, long as I had known her. She refused to kill any of the creatures, which could have been put to effective use, when I told her they were intelligent. I was more careful this time, fearing that you might react in the same way."

Faivonen fought off an urge to retch. "I certainly would have. How do you know they are intelligent? Are you sure?"

"Of course. The motion patterns of their tentacles and the changing colors of their gas bags are repetitious, and seem to cor-

relate with their actions in rising and sinking. I have been watching relays of messages going up and down the valley from one of the creatures to the next."

"Then they can see? We didn't find anything like eyes in this one."

"A very interesting problem, I agree."

Faivonen fell silent, and thought for several minutes. Then he removed and opened his shoulder pack, groped through its contents, and pulled out several pieces of metal.

"You're giving up on your gamble?" asked the diamond.

"Not exactly." Faivonen said no more. He selected two of the metal fragments, and cut a long strip from the gas bag, five or six centimeters wide. Then he removed the straps which held Beedee to his wrist, placed one piece of metal against its flat surface and the other on the curved one, and wrapped the skin around everything. He left the rounded ends of the machine, where its eyes and pressure senses were located, clear. Then he cut several much narrower strips and used them to tie the "bandage" in place. The package seemed secure.

"Current flowing, Beedee?"

"Adequately, thank you."

"Good. I've noticed that there is a breeze at our level coming from down the valley, while the gas river is still flowing in the opposite direction. Any explanation?"

"Certainly. The gas is siphoning—enough weight has flowed down the valley to maintain the current. The last time it got to the point where we first met the frost, and then was forced back by the tidal wind; this time it's set for the season, I judge. What we feel is the regular wind, riding over the carbon dioxide."

"So the gas river will flow for several weeks."

"It seems likely."

"And I can't get away."

"I don't see how."

"All right." Faivonen picked up the diamond and approached another of the balloons, now shifting a little in the rising wind. With more strips of skin, he bound the package to one of the thicker tendrils, still taking pains to leave the diamond's sense organs unobstructed. Then he stood up and looked down at the glassy half-cylinder for several seconds.

"Nothing personal," he said at last. "You put my wife in a situation which would kill her unless she changed her personality. You've done the same with me. Perhaps you aren't guilty of kill-

ing us—those human quirks you've mentioned, which are good for species survival but not for individuals, are probably doing that—but I don't choose to quibble. If my kids ever come looking for me, I don't want them to find you."

"The balloon won't support me." Beedee's voice was fainter, but quite audible.

"It will support you in carbon dioxide. Try calculating which wind will carry you. I'm betting on coldside—you wanted to see it anyway." Faivonen pushed the balloon off the shelf with his foot.

"Thank you, Elisha." The voice was much fainter, but the words could be made out. "I am coming to understand human beings. This was the action I hoped you would take. Depending on glacier speed, I should be back with your people in a few millennia—I, too, am betting on the wind toward the cold side. I seem to be winning. Of course, if these creatures have a way of coming back, I may see men sooner. I regret that you won't be there; you have been almost as interesting a property as your wife. Of course, if I do happen to get back in months instead of centuries, it would be inadvisable to have your report of my admittedly unhuman behavior waiting for me."

The voice stopped. Faivonen watched the balloon for several minutes as it drifted slowly up the valley. Then he walked to the end of the shelf nearest the chimney, took out his rope and grapnel, and made sure the latter was firmly attached.

The he began climbing down.

"But how will we do without the diamond?" Sullivan was quite frankly horrified.

"Quite well, I should think," replied Faivonen. "We do without simpler calculators, aircraft, radios, and all sorts of other things we decided to eliminate until we could make them ourselves from local materials. This ship of yours shows we *can* do what has to be done. Come on—you know we couldn't afford to be dependent on anything we couldn't produce here. Beedee was left out of the original deal because he, or it, was private property, and anyway no one could decide whether he was alive or not—he might have been a citizen. Some of the younger generation have been claiming there was no use learning to read and write—Beedee would remember everything and tell us everything—that he wanted to us to believe. That, friend Sullivan, is very bad indeed, and you know it."

"I know it, but a lot of others don't. They'll want to lynch you

for losing all the knowledge of Medea we've picked up in twenty years, and they'll be right; we can't live without it."

"They won't and they'd be wrong," said Faivonen. "In the first place I didn't lose it; most of what has been learned is either common knowledge, or has been written or remembered by someone with special interest. In the second—look, Sully: Beedee knew years ago that the balloons were intelligent, but didn't tell anyone because he foresaw it would interfere with his life style. He knew perfectly well that with the carbon dioxide river flowing one way and the air the other, the gases would be turbulent and mix at the interface—there would be oxygen enough for meters below the so-called surface of the gas river, which he wanted me to think of as the drowning line, to let me breathe and climb over to the chimney and back up again. It hurt, and was hard to keep breathing control, but I could do it and did do it. Did he tell me? No. He didn't really care whether I died there on the shelf, but he wanted to make sure I sent him off to coldside. He wants knowledge the way a baby wants milk or a teen-ager wants sex, and he's as completely selfish about the appetite as a baby or an untrained adolescent; humanity is a convenience to him, but its individual members are expendable conveniences. The key fact is that we can't trust him, and once people realize that, no one's going to want to lynch me."

"You mean he's done this sort of thing to us before? We don't know what to believe, out of what he's recorded for us?"

"Just that. I'd have smashed him for killing Riita, only the fact that he didn't get away or stay conscious makes me believe he made an honest mistake that time. Maybe, if he gets back early and I'm still alive and cooled off enough, I'll be able to ask him for the real details."

"You've been calling Beedee *him* instead of *it*. You really regard—him—as alive, don't you?"

"Yes. As alive as I am, or you are, and potentially just as much a member of society. But what use is a liar to any society?"

Dear George:

In my recent article on quarks I was prematurely elated at the prospect that the four quarks known at the time might be the bottom line—that all the doings of the heavy particles might be explained as the results of the various interactions between these four quarks and their antiquarks. Alas, Murphy rides again—in particular that corollary of his law which states that any time you think you understand something you find out you don't. It appears that a new "heavy particle" called the Upsilon has very recently been discovered, and in order to explain its properties it is necessary to conjure up a fifth quark-antiquark pair with a high mass and a charge of –1/3 for the quark. In order to keep things symmetrical, the theorists immediately conjecture that there might be a sixth as well.

Who knows where it will all end?

Best regards,

Milton A. Rothman
Philadelphia PA

Dear Dr. Asimov and Mr. Scithers,

Are you real? I just finished reading, from cover to cover, my first issue of your magazine (your fourth, the Jan-Feb issue) and I'm completely at a loss for words. Can so much enjoyment actually come from a single magazine? Can one piece of periodic literature, from the editorial to the book review, give off such a feeling of hominess as to make one feel, once again, like a person instead of just "a reader"? Does there really exist a letters column where a person can write in, say what he thinks, and actually get an "old-fashioned" reply??? Is it true?? Or is this some sort of a trick? Or, a trap perhaps?

That's what it is, isn't it? This is some complex scheme conjured up by an alien mind bent on conquering the world. I know what you're up to. You can't fool me. I know what you've done. You've sat up there in your invisible starships studying us, trying to find a weak point. After a while, you came up with this brilliant idea of making a magazine that a person could actually sit down and *enjoy* just for the simple pleasure of enjoyment. Then, you slap the name of one of the best science and science fiction writers in the

world on the cover, and put it on the market as a "new science fiction magazine." Then, after a time, when we've all fallen into the habit of wanting it, expecting it, actually looking forward to it, you'll take them all away, even the past issues, and, while we're in a severe state of depression, come down and conquer us! BUT IT WON'T WORK, I TELL YOU! IT JUST WON'T WORK!!!!

Very truly yours,

B. R. Barbre

Good heavens, you have penetrated our scheme. Back to the drawing board, George.

—Isaac Asimov

Dear Mr. Scithers:

I have been boycotting SF magazines since 1976, when I got fed up with deep philosophical pessimism. But my friends praised your first issue so much that I decided to look into it.

It was great! I've been waiting for a magazine with both sophistication *and* humor, published (it seems) for hard-core aficionados rather than the masses. There are, however, a few points in issue three:

Varley's "The Barbie Murders" was virtually characterless. Lieutenant Anna-Louise Bach is a cardboard sleuth from a second-rate pulp, surrounded by shadows. The only 3-D person are the barbies. I liked the plot, but stories don't live on plot alone.

"True Love" was an extremely worthwhile experience. As a student of computer science, I found it particularly enjoyable, and highly plausible.

Laumer's "Birthday Party" was unoriginal and not in the least shocking. I used the same idea in a fantasy world in 1972. I suppose Mr. Laumer realizes that the mind of a newborn baby is fully developed, so that even if physical development were drastically slowed, the child could still learn a form of communication ("teethless English") and receive a Ph.D. in Biochemistry by age thirty.

"Ivory Tower Meets Middle America" is a tremendous work. Tony Rothman has something to say and knows how to say it without sounding pretentious, condescending, or like Robert Heinlein. I'd like to see more of his work in the issues to come.

Sincerely Yours,

Jeff Dennis
Rock Island IL

Listings of stories are better than nothing, but some critical evaluation is even more useful to the author, though I prefer uncritical applause myself.

—Isaac Asimov

Dear Mr. Scithers:

A salute to the January-February issue with one unfortunate exception. Dr. A.'s recent Hugo award is no excuse for perpetrating "True Love." He should be drowned in syrup of ipecac as a lesson, since he inflicted on the readers yet another version of Kurt Vonnegut's "Epicac." If he shows signs of serious repentance, he may be spared.

Otherwise, the Varley story was up to his usual high standard, and "A Delicate Shade of Kipney" was a promising beginning for Ms. Kress. "African Blues" was also an unusual first effort.

Although I too was offended by Stephen Goldin's bad taste and poverty of imagination in the Fall '77 issue, I have hopes that the error won't be repeated by either you or Goldin. Perhaps a rebuttal story by Kathleen Sky is in order, or does that come under the heading of encouraging domestic discord?

Sincerely,

Linda Frankel
Huntington Station NY

I haven't read Vonnegut's "Epicac," but I gather that I have unwittingly duplicated some facet of his story. I'm afraid this is neither the first nor the last time this will happen to me—or, for that matter, to anyone else.

—Isaac Asimov

Dear. Dr. Asimov:

I have been reading your magazine ever since I saw your face on the first issue and seized the copy forthwith. I am pleased to note that you have changed to bi-monthly issues and I hope that monthly issuing is not far behind. In view of Mr. Scithers's request, my ranking of stories and features in the January-February issue follows:

1, Editorial; 2, Letters; 3, "True Love"; 4, "The Case of the Defective Doyles"; 5, "There Will Be A Sign"; 6, "Ivory Tower Meets

Middle America"; 7, "Panic"; 8, "The Barbie Murders"; 9, On Books; 10, The SF Conventional Calendar; 11, "The Thrill of Victory"; 12, "The Witches of Manhattan"; 13, "They'll Do It Every Time"; 14, "A Delicate Shade of Kipney"; 15, "Birthday Party"; 16, "African Blues"; 17, "A Mother's Heart: A True Bear Story"

I realize that this letter has already become overlong, but I would just like to add that I am *very* happy that a magazine has finally come out which emphasizes the "hard-core" science fiction instead of the fantasy and New Wave branches. Thank you all for creating a magazine for the serious science fiction reader.

Sincerely,

Stephen Fleming
Atlanta GA

It strikes me that the adjective "hard-core" is used most frequently to modify another noun we need not mention here. I wonder if someone can suggest a better name for the kind of science fiction men like Arthur Clarke, Hal Clement, and I write.

—Isaac Asimov

Dear Mr. Scithers:

I just received my first issue of *IA'sfm*, and quite frankly, I was shocked! Why, there were several places where you sounded as though you actually *encourage* new writers! Unheard of! Actually, this alone was worth the price of the magazine. Writing science fiction is something that I've always wanted to do, and you sound like you really want to develop new talent. Please send me the description of your needs. [*Done!*]

As to the issue's (January-February 1978) story content, it fell into three distinct groups. "The Barbie Murders," "True Love," "Panic," and "The Witches of Manhattan" were excellent. "The Case of the Defective Doyles," "There Will Be A Sign," "Birthday Party," "A Mother's Heart: a True Bear Story," "A Delicate Shade of Kipney," and "They'll Do It Every Time" were fair. And "African Blues" and "The Thrill of Victory" were downright boring.

Thank you for your time.

Sincerely,

David T. Barnes
Constantine MI

To be perfectly honest, all science fiction magazines would love to find new, young authors of talent. We seem to be more talkative on the matter, perhaps.

—Isaac Asimov

Dear Dr. Asimov:

I do have a specific bone to pick with the very first issue of *IA'sfm* I've read, however. I found "The Ivory Tower and Middle America" completely pedantic, pointless, and offensive. Mr. Rothman depicts the NRAO in Green Bank, West Virginia to be a rather welcome outpost amidst the teeming savages, local or otherwise. He neglected to point out that the reason he is obliged to conduct tours of the NRAO is that the savages who come from miles around to be wowed by the gizmos are, like the general citizenry, footing the tab for that form of pure research. There is no better way, in my opinion, to damage the means by which research can be done than to first of all, write that sort of crap, and secondly, print it. I would suggest to Mr. Rothman that a capital way to keep from becoming overly perplexed by all the ignorance in the world is to be concerned about it strictly on a personal basis.

James K. Carter
Cincinnati OH

As a matter of fact, the dependence of science upon the public purse is something that I, myself, do not forget. See my editorial, "By No Means Vulgar."

—Isaac Asimov

Dear Dr. Asimov & Mr. Scithers:

Congratulations on your beautiful January/February issue of *IA'sfm*. In the opinion of a novice (I have only been into science fiction about a year and a half), your magazine is one of the best going. My story ratings are as follows: (rated 1-10)

10. Editorial, "A Delicate Shade of Kipney"

9. "True Love"; "Ivory Tower Meets Middle America"; "African Blues"

8. "There Will Be a Sign"; "The Witches of Manhattan";

7. "Panic"; "Birthday Party"; "They'll Do It Every Time"

"The Barbie Murders" is 5. (All other stories I rate below 5.)

I was surprised to learn the issue came out December 15th. I found one (I repeat, *one*) copy on my newsstand on January 6th! This brings to mind a vivid picture of the distributors sitting around reading *IA'sfm* before they let the poor customers have it. For this reason, I have decided to subscribe. It is very nice of you to put the order form on a postage-paid post card; however, how does one go about putting the "enclosed" money in a post card? (I used an envelope).

Cherly Newsome
Birmingham AL

I admit that that's a brand-new explanation of faulty distribution. It is an attractive thought, but inherently improbable, I think.
—Isaac Asimov

Dear Sir:

I finally find myself with the time to put down my comments on the January issue of IA'*sfm*. The weekly blizzard has passed through, leaving my car half-buried in a drift.

The January issue was a letdown after the quality of your previous issues. The cover looked like a picture of the Man From Glad. The stories were all rather plastic as well.

I would rate "The Barbie Murders," "True Love," "Birthday Party," and "A Mother's Heart" as being lousy with the other stories all being mediocre.

The most disappointing story is "The Barbie Murders." It has such an interesting premise, but it gets mired down in such silliness and poor taste as pubic wigs and the like.

Better luck next time. And stay out of the hospital, Isaac. We need you.

Sincerely,

Gary Helfrich
Auburn IN

While I can't say we particularly like unfavorable judgements, a letter like this (once in a long while) keeps us on our toes.
—Isaac Asimov

Dear Mr. Scithers and Dr. Asimov,

I have read and enjoyed the January-February 1978 issue of *IA'sfm*. I really enjoyed Martin Gardner's puzzle. Some of the solutions could be improved; i.e., in the first solution, he could have removed 0, 1, 2, 3, 4, and 5 doyles from the cans and still found the can of defective doyles. The biggest problem that I can see is that the two men are making more work for themselves or else they are throwing away valuable doyles. In the third solution, the two must discard an entire can of doyles (good or bad), or sort through a minimum of 93 doyles to keep from throwing out perfectly good doyles.

I thought for a while that they could have saved themselves some work, by weighing the cans after removing the appropriate number of doyles, but I forgot that the cans did not have a standard weight. I think that in the long run, the two of them would be better off to remove one doyle from each can and weigh it separately—less work that way.

Despite these minor flaws, I enjoyed the challenge that Martin Gardner's story presented. I hope to see more of his work in your magazine in the future.

Sincerely,

Herb Monroe

We intend to have Martin with us as long as we twain shall live. Never fear.

—Isaac Asimov

Dear Mr. Scithers;

I would like to take this time to reply to Linda Manning Myatt's letter, published in the January 1978 issue.

I rather enjoyed both stories that she saw fit to rip into, so she's hit a sensitive spot. Being female myself, I would be the last person one would expect to defend "male supremicist conceptions." So I won't. I didn't consider "Where There's No Man Around" to be anti-female in the least. As a matter of fact, I found it rather amusing, if not totally plausible (I, for one, have never been able to start *anything* with a bobbypin, much less a sand tractor). Maybe Ms. Myatt is hypersensitive, but that is no reason to drag Our Isaac & Co. down in the dumps.

I reread Ms. Myatt's commentary and "Minster West" several times, and her views are still so obscure as to be meaningless. "A

short story about technology and automation"??? Of course, there *was* a reference to them in spots, as in most science fiction, but by no means was it a story concentrating on either one. Her slur on Mr. Cochrane's writing ability is inexcusable, as are her aspersions on your talents. I don't understand why Dr. Asimov tried to placate her. You don't need that kind of reader. Let her go back to Wonder Woman stories.

Sincerely,

Laura Brevitz
Battle Creek MI

Well, now, we all have a right to our opinions, and a little all-out controversy is uplifting and refreshing—but if two young women are going to have at each other, I'm staying on the sidelines. It's one thing to be brave; quite another to be crazy.

—Isaac Asimov

Dear Dr. Asimov and Mr. Scithers:

In a letter a month or so back I complained about this picture of some guy who kept appearing on the cover of your magazine. Well, I finally figured out that this person is none other than the dear Dr. Asimov. Imagine my chagrin, my embarrassment! So *that's* why that face was on the cover. Well, it makes sense now. Sorry about that, Dr. Asimov.

Now that all of us out here recognize the good doctor, I am pleased to see that you are putting SF art on the cover. It is entirely appropriate that your first cover art should be by Freas, who's won enough Hugos for Best Artist that he could melt them down and make a Mercedes. Nice cover, that. But I especially liked the cover for your January-February 1978 issue. Not only did it have rayguns and a spacey looking ship, but the maiden was scantily clad (in all the right places!) and the man was big and muscular, complete with ripples and throbbing veins. Hot jets! Now that, dear sirs, is *skiffy*.

Onward and upward. Could we please have a BEM in the next issue, or maybe some flaming lasers?

Best,

Michael A. Armstrong
Sarasota FL

No sooner said than done. The March-April 1978 issue did *have a BEM. We aim to please.*

—Isaac Asimov

Dear George:

Re Isaac Asimov's and Mr. Walsh's comments on Simon Newcomb and the flying machine (Mar-Apr 1978, p190), what Newcomb actually said was that the solution of the problem awaited "the discovery of some new principle" of propulsion. Actually, although Newcomb did not realize it, the "new principle" had already transpired, in the form of the internal-combustion engine. But let us not make him out to be less intelligent and foresignted than he was.

Cordially,

L. Sprague de Camp
Villanova PA

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George H. Scithers

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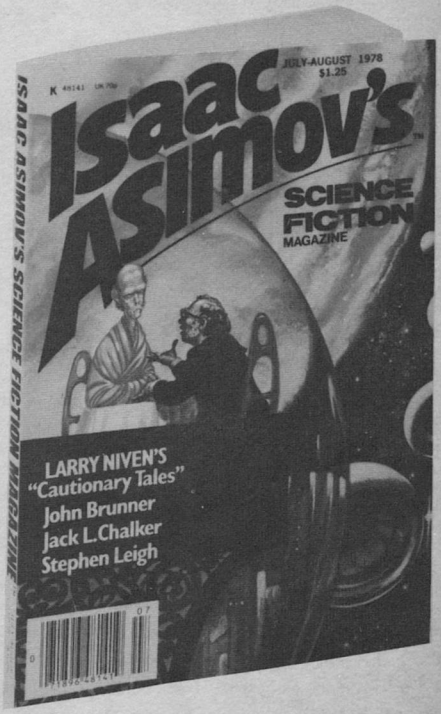

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