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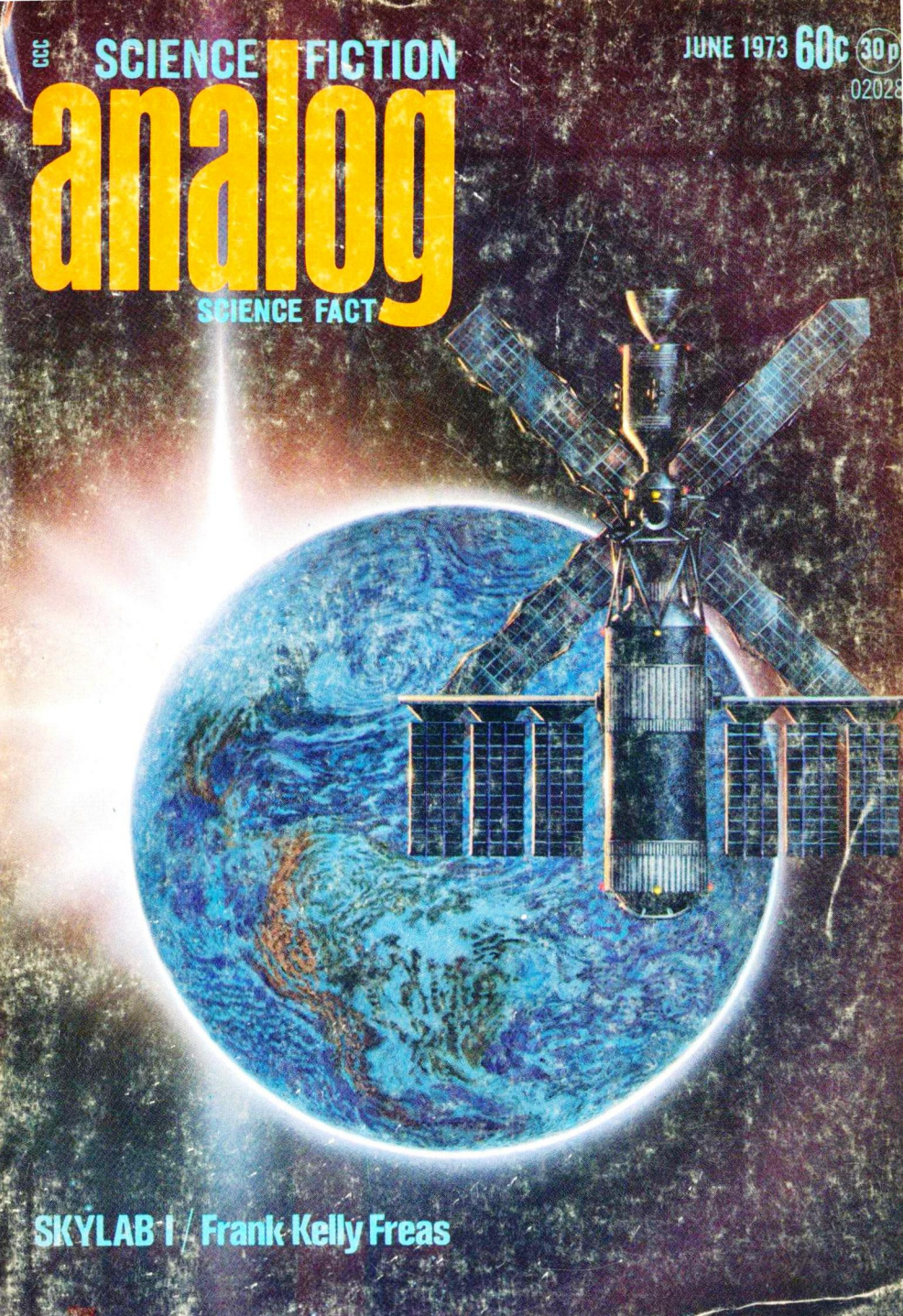
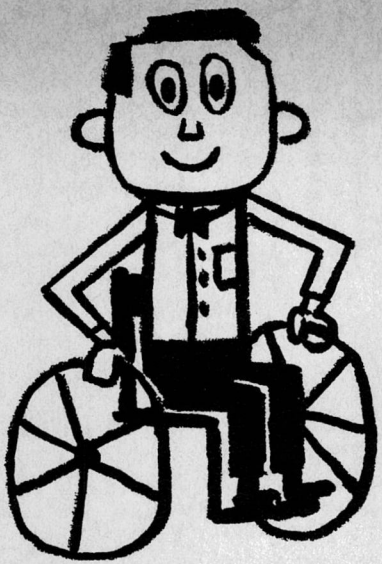


SKYLAB I / Frank Kelly Freas



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B. F. SKINNER: The Man in the Maze

Genetic engineering will soon be "tailoring" human physical and mental traits to order. Can behavior engineering "tailor" entire societies?

NORMAN SPINRAD

"Man's struggle for freedom is not due to a will to be free, but to certain behavioral processes characteristic of the human organism, the chief effect of which is the avoidance of or escape from so-called 'aversive features of the environment'."

Thus spake Burrhus Frederic Skinner in "Beyond Freedom and Dignity," a turgidly written theoretical tract published in 1971 which nevertheless has climbed onto the best-seller lists, become a scientific, intellectual, and political *cause célèbre,* horrified people in all walks of life, set the country to muttering of "1984 in 1972" and made B. F. Skinner about the most popular scientist since Dr. Strangelove, with whom he's often compared.

If you don't quite understand why the above quote from Skinner can send blood pressures skyrocketing, he said the same thing in words of one syllable way back in 1948 in a utopian novel called "Walden Two":

"I deny that freedom exists at all . . . Perhaps we can never prove that man isn't free . . . but the increasing success of a science of behavior makes it more and more plausible."

It would be comforting to dismiss such a statement as the mutterings of a crank, but B. F. Skinner is generally considered the "foremost living psychologist." He is the founder and chief guru of "behaviorism," and the behavioral technology he pioneered has produced innovations in education,

criminology, public policy, and the deeper recesses of advertising. Thus "Beyond Freedom and Dignity" is an intellectual gauntlet thrown in the face of a thousand years of Western Man's concepts of freedom and the dignity of man, and the challenge has been issued by a man who cannot be ignored.

And lest you think that this is simply an arcane theoretical dispute within the science of psychology, here is Skinner's prescription for bringing about a utopian Golden Age, his method for governing the citizens in his ideal village, "Walden Two":

"We can achieve a sort of control under which the controlled, though they are following a code much more scrupulously than was ever the case under the old system, nevertheless *feel free* . . . they are doing what they want to do, not what they are forced to do . . . by a careful cultural design, we control not the final behavior, but the *inclination* to behave—the motives, the desires, the wishes."

Sounds a bit like a dictum from Orwell's "Ministry of Love," doesn't it? Or something out of the companion piece to "1984," "Animal Farm," which is more to the point in a way, since Skinner's whole psychological system grew out of his early career in the field of animal behavior. He put pigeons or rats into sealed cages, closed artificial environments entirely controlled by the experimenter. By rewarding the creatures with food for desired response to desired stimuli, he found that he could create almost any behavior he wanted to create without using punishment, solely through the use of *rewards,* or "positive reinforcement."

This technique became called "operant conditioning," and the controlled environments themselves were the now-famous "Skinner Boxes." Skinner also invented an "air crib," a device something like a large air-conditioned aquarium with a moisture-absorbent floor and humidity and temperature controls (and therefore something like the closed deterministic environment of a Skinner Box), in which an infant could be stored in naked and safe comfort when the parents were otherwise engaged. It was nothing more sinister than a simple sort of robot babysitter.

But when Skinner used the air crib in the upbringing of his own daughter, the popular press gleefully confused it with the Skinner Box and painted an amusing picture of Skinner as a comic-book mad scientist who believed you could lead people around by their reflexes like Pavlov's dogs and raise children as you would train rats or pigeons, in the controlled environment of a plush cage. Cranky old Doc Skinner and his diabolical device were always good for a quick laugh in those days.

Nobody is laughing now.

Today, the "behavioral technology" that grew out of these simple animal experiments is beginning to permeate our culture. Programmed learning, for example, leads a student through material by making right answers pleasurable with verbal rewards and advance to the next item, thus "reinforcing"

correct learning behavior. It works well enough to allow simple machines to replace human teachers, and with increased comprehension, too. Similarly, by programming the environment of schizophrenics so that "normal" behavior receives concrete rewards, such as tokens that can be traded for sweets, behaviorists have actually caused schizophrenic symptoms to abate, on the principle that a human schizophrenic—even though severely disturbed in his higher mental functions—is at least as responsive to operant conditioning as a pigeon which *has* no higher mental functions. Governor Ronald Reagan's plan to force welfare recipients to work without pay in order to reduce the welfare rolls by eliminating the positive reinforcement effects of welfare payments is only the most obvious effect of Skinner's current influence on public policy.

"Beyond Freedom and Dignity," then, is the manifesto of a man whose influence is already of enormous social consequence, and whose star seems to be rising.

And it begins with a denial of the existence of human free will that simply cannot be dismissed out of hand. Drawing on a precept derived from his years of experimenting with animals in simplified controlled environments, Skinner makes the self-evident observation that the only aspect of human psychology that can be studied scientifically and objectively is that which can be observed objectively: behavior. From this single premise, he develops an almost mathematical calculus that seeks to explain all human behavior as the deterministic result of patterns of positive and negative reinforcement inherent in the physical and social environment. According to Skinner, we are nothing but flesh-and-blood automatons programmed by our genes and by our environment, so complexly programmed that we falsely believe that we are independent agents possessed of free will.

In metaphysical terms, Skinner is attempting nothing less than the scientific refutation of the existence of the human soul. No wonder the publication of "Beyond Freedom and Dignity" has filled the public air with the smell of fire and brimstone!

According to Skinner, we are born into a deterministic environment which shapes our behavior patterns from the very moment of birth. We are born as creatures with a genetic coding that sets the limits for our physical equipment, up to and including the fine structure of our brains. The environment, including the people around us, instantly starts rewarding us with "positive reinforcements" that encourage certain behavior, and punishing us with "negative reinforcements" that discourage other behavior. Skinner calls these patterns of reward and punishment "contingencies of reinforcement"; those contingencies which are arranged by other people are "social contingencies of reinforcement," and he contends that "social contingencies, or the behaviors they generate, are the 'ideas' of a culture; the reinforcers that appear in

the contingencies are its 'values'." These patterns of social programming *are* human culture, and, along with the physical environment, make up our total psychologically effective universe. Thus, the very evolution of the thought patterns that give us the illusion that we have free will is entirely determined by the pattern of reinforcement contingencies of human culture which makes us "human."

Feral children brought up by wolves within the contingencies of reinforcement of the wolf pack and in the absence of human culture in fact lack what we generally regard as human consciousness. They have acquired the behavior patterns ("repertoires of behavior" in Skinnerian terms) of wolves. They may be human in terms of biology, but they act and think like wolves because they have been programmed by their total environment to be wolves, not human beings. They seldom if ever are able to adapt to human society.

What then shapes these patterns of social reinforcement which makes us what we are as human beings in any human culture?

Skinner sees human culture as the product of an unselfconscious evolutionary process. "A culture, like a species, is selected by its adaption to an environment: to the extent that it helps its members to get what they need and avoid what is dangerous, it helps them to survive and transmit the culture . . . A given culture evolves as new practices arise, possibly for irrelevant reasons, and are selected by their contribution to the strength of the culture as it 'competes' with the physical environment and with other cultures."

A sophisticated reinterpretation of Social Darwinism, indeed! Cultural traits (patterns of conditioned reinforcement which cause members of a culture to react in predictable ways to predictable stimuli) arise more or less randomly, much as genetic mutations which create species traits on a biological level arise through the chance juxtaposition of a gene with a fast-moving subatomic particle. As with genetic mutations, those new cultural traits which increase the survival chances of the individuals who acquire them tend to get diffused among the general population; those which do not, tend to extinguish themselves.

Once a trait becomes part of a culture, it either increases the survival value of that culture or decreases it, depending upon the conditions in which that culture exists at any given time. As conditions change, a cultural trait which may have originally increased the survival value of a culture may become detrimental.

For instance, in ancient India, the physical fact of high infant mortality rates plus the positive value of having many children to till the land encouraged large families and many births; in Skinnerian terms, having many children was positively reinforced by the environment itself. Later, Indian culture incorporated positive *social* reinforcement for a high birth rate into the Hindu religion. As long as

continued on page 167

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Conrad
Kerwin

Skylab Patchwork

How does an artist take a simple statement like, "Design a shoulder patch for the crew of Skylab One," and turn it into a picture that symbolizes the works, hopes and dreams of the entire Skylab team?

Frank Kelly Freas

It was Ben Bova on the phone: "How would you like to do a shoulder patch for the first Skylab crew?"

"Love it."

"Well, I gave them your address and phone number—if you don't get word from them in a couple of days, call Commander Kerwin at this number . . ."

Forty-seven hours and fifty-nine minutes later, I was on the phone to Houston: "About that shoulder patch . . ."

Every artist has certain jobs in mind that he would pay for the chance to do, and this was one of mine. But right from the beginning Commander Kerwin made it clear that this was a commissioned job—not a gift. NASA can't get involved in any commercial deals, and it doesn't like being beholden to anybody either.

For any few that may not know, the astronauts of each of the Apollo shots have had designed and worn a shoulder patch that is distinctive of that shot alone. The insignia are primarily used for the fire-resistant cloth of the suits, but as every souvenir collector soon discovers, are also manufactured

and sold as cloth patches to be sewn on shirts and jackets, as decals for notebooks, autos, wall, and so on, and as ashtrays, keychains, paper weights, and anything else an enterprising manufacturer can dream up.

I suggested that the astronauts give me their ideas of what appealed to them and let me do some sketches, and any photographs and general information on Skylab they could give me would be appreciated. I had read Joe Green's Skylab article only a couple of weeks before, so I still felt like an authority on the subject—but when a box fifteen inches square and nearly as deep arrived from the Manned Spacecraft Center of Houston, I began to think there might be something I had missed.

It took two full days just to read my way to the bottom, but when I finished I was an authority on Skylab. (I should mention that the condition of being an authority on any subject is, in my case, a strictly temporary one; it seldom survives the next assignment. Occasionally something sticks, however, and it looks as if Skylab might be one of the things.)

In addition to my own reading, I had a really good description of Skylab and its aims from Commander Kerwin's letter: "The formal experiments break down easily into three major categories plus miscellaneous. The major ones are: 1) Earth resources; 2) solar physics; 3) medical. The miscellaneous includes individual experiments in solar and stellar astronomy, zero gravity technology (for example, crystal growth, flammability, sphere-forming, et cetera), plus an ill-defined but important objective called habitability, which simply means 'how to build a proper and efficient space station'.

"Under solar physics, the ATM (stands for Apollo Telescope Mount, obviously an old and inaccurate name) is a really sensational package of optical instruments designed to photograph and spectrograph the sun . . .

"The Earth resources program pretty well speaks for itself . . . The medical experiments are not going to cure cancer or heart disease, in the short run; they're designed to measure very carefully man's patterns of response to weightlessness, so we can fly longer and farther next decade . . . So obviously you can't include a visual reference to everything Skylab is about . . . The kinds of ideas we've been tossing around have emphasized that it's a peaceful mission; that in addition to doing 'pure' science *a la* Apollo, we're doing work that will directly benefit Mother Earth and its citizens;

and that, in a very real sense, we are doing more than just exploring near-Earth space—we're homesteading it, preparing to live and work up there. Thus, doves of peace, Earth scenes, optical devices, covered wagons, plows, and log cabins have all come to mind."

Meanwhile I was thinking about the technical aspects of the design. It would have to be bright, simple and postery. It would have to be planned for the easiest possible stitching, since it would be reproduced in embroidered as well as silk-screened patches. It should be contrasty, to record well in black and white photos of the astronauts. There would be lettering—ghastly thought. I could get around that by working big enough that reduction to finished size would disguise my errors, but that might be very misleading in regard to the amount of detail I could get into the design as a whole.

I finally decided that twice up was as large as I could safely work. That would allow me an eight-inch circle, but that problem solved itself promptly since the maximum circle I could get onto my polar coordinate paper (I use it mostly for casting horoscopes) was seven inches.

Whatever lettering was used should be a good one-fourth inch in the final product: anything smaller would fuzz out in the embroidering.

There was no law that said the patch must be circular either. How about a triangle or perhaps a pentagon—scratch that—octagon, maybe. But I was dealing with the Skylab cluster, which is a complex, angular shape any way you look at it—this would need smooth and simple curves to set it off.

It is my custom, when given suggestions by a client, to work out sketches incorporating them first. This method accomplishes two things: it gets the deadwood out of the way quickly, and if, as frequently happens, there is a good idea offered, it starts my own mind working in the right direction. An artist shouldn't expect his client to be able to visualize *anything*. Few people can. If he could, he wouldn't need an artist in the first place. The client's function—besides paying the bill—is to give the artist the information relevant to, and if possible, the feel of, the problem. The artist then tries to state it in visual form.

It didn't take long to experiment with—and to discard—such possibilities as Conestoga wagons, cornucopias, galleons, and so on, as either too complex or too blah, although the dove of peace gave me a few bad moments.

The nature and function of Skylab wasn't helping a great deal in establishing an insignia.

At this point I stopped playing with symbolic ideas and started juggling the form itself. It very quickly became clear that there was only one way to look at Skylab which would instantly establish its identity. No 3-D, no perspective, no cute angle shots—it must be a flat-on dead square silhouette. We would let the Skylab cluster become its own symbol.

It also appeared that there was something more here than met the eye. The silhouette shape of the cluster was a strikingly familiar symbol. Was it an alchemical symbol, a religious sigil, or maybe a hex sign? Every authority on symbols I showed it to said, "Oh, yeah, that's a . . . er??" And so far no one has identified the original in spite of the sense of familiarity. The only thing we're sure of is that it is *not* alchemical or astrological. Many magical symbols come close, but don't quite make it. Very curious indeed.

The shape being decided, the possibilities became more manageable. Should we emphasize the relationship of Skylab to the Earth, or relate it to the sun, in recognition of its unique solar laboratory? Let's try both.

Among the suggestions the astronauts had made was the idea of a solar eclipse as seen from Skylab. It soon became clear that this idea would solve several problems at once: it pointed up the solar study function of Skylab, it would give me the large circular shape of the Earth as counterpoint to the angularity of the cluster, and it would establish firmly the connection of Skylab to the Earth. In addition, it would give a chance to get the necessary high contrast for good visibility of the tiny finished patch.

As for color, I would want to use the blues, browns and violets of Earth, the cluster would be black, and we would suggest the riches of the universe by backing them up with the sun's rays in shades of gold, from yellow to russet. But just in case I was thinking too conservatively, we'd try a few in bright reds and oranges too. The solar flares and loops might be a nice touch if it didn't get too busy.

Meanwhile, thoughts of a motto had been buzzing in my head. "Out of this world"—naturally. Maybe it would need the qualifier "for the good of the world"—all in my bastardized Latin, of course. *Ad Auribus in spatio* would be lovely, but it really wouldn't do, I suppose.

"We thought the motto ought to be in English," remarked Commander Kerwin. "Latin might put people off. We were thinking of

Rough color sketches - second stage.
These were submitted to the astronauts.

'Replenish the Earth'." The possibilities of that one didn't bear thinking about. We kicked it and a few others around for a while and then decided against using a motto at all.

I worked up rough color versions of several ideas and sent them off to Houston. It developed that my own number-one choice was running neck and neck with a pretty one featuring the diamond ring effect. With rare good judgment the astronauts had unanimously selected the two best designs out of some eight or ten sketches.

There was only one reasonable solution: I didn't want to push my own choice—it was after all *their* insignia. I made large renderings of both designs, being very careful to emphasize the best features of each. I meant to be sure that the choice made would be based on the actual merits of each design, not on what we *hoped* it might be.

As before, the astronauts picked the right design. The alternate was unquestionably a prettier picture—but it lacked the carrying power and the impact of the one chosen.

From there on all was straightforward going. I made several studies of cloud patterns on the planet, reducing them finally to very conventionalized swirls. The Skylab cluster was simplified and simplified again, till it became simply a black form with a white edgelight to set it off.

Being a naturally lousy letterer, I did the lettering roughly 483 times before I got it somewhere near right, and then discovered that I had reversed the *ei* in *Weitz*. Doesn't sound like much of a problem until you realize that it changes the spacing of all the letters in the name, and shifts all three names a few degrees left, which meant also adjusting the background to give adequate contrast.

There was one interesting factor in the development of the lettering. If you will glance at the patch, you will notice that there are three radiant centers with which to deal: the Earth center, the sun center, and the center of the patch. Now: without looking, from which does the lettering radiate?

Yes, it had to radiate. Rectangular lettering would have worked around the rim: you simply use a radius as the center vertical of each letter, and space them normally. Once you move inward from the firmly established band of the rim, however, the optical tension changes. Your own eye insists that the verticals become concentric, because your whole visual orientation is toward the center of the circle.

Which center point? Would you believe a fourth?

Comprehensive sketches, submitted for final choice of design.

① Can get some detail into cluster by keeping to white and lite gray blocks, no lines (they get mushy when embroidered)

② Continents just barely indicated, but feel symbolic treatment (as on N° 1) is better

③ Smaller cluster placed there would be almost without detail, but pure white to carry design

I did a careful rendering in black and white, to make it easy for the manufacturer to follow my strokes, in setting up his embroidering machines. In machine embroidery, colored threads are stitched onto a backing material according to the desired pattern. The design is usually laid out on a grid with colors indicated by number. There are roughly five hundred shades of thread available for color matching. The setup man for the machine translates this coded grid to a punched tape very much like a computer tape—except that to me, at least, it looks ten times more complex.

The tape tells the machine what thread goes where, and what direction it should move, on the visible side of the fabric. What happens on the back of it, nobody cares; it's when the threads start going all directions on the face that things get messy.

Ideally, each stitch should be directly related to the shape it is helping to fill—that is, a radial shape would be radial stitches, a rectangular shape with horizontal or vertical stitches, a diagonal with diagonals, et cetera.

Years ago, I had a friend whose job was setting up such machines, and some of the descriptions he had for artists who failed to take his problems into consideration are still, in this permissive age, thoroughly unprintable.

The black and white guide being finished to a more or less satisfactory degree, I made a color drawing to match, so the setup man would know exactly what I intended. I wasn't concerned with doing an attractive picture so much as with getting a good finished embroidered patch.

We shall see what happens . . .

After making copies for my files, I sent the finished product off to Houston. A few days later, I was rewarded by an enthusiastic approval, with one slightly embarrassed demurrer. "We need—I do hate to say it—a letter from you promising not to commercialize the design."

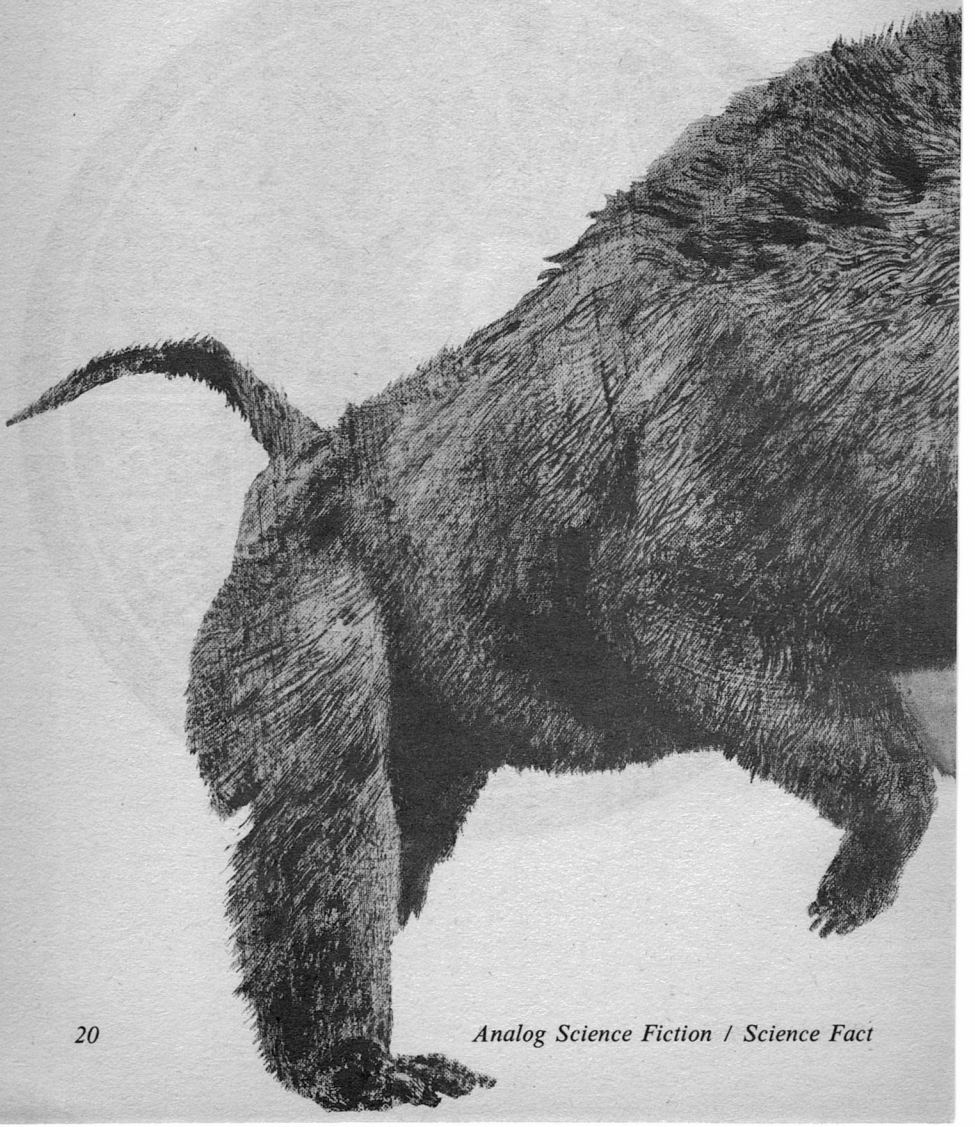
"No problem," I replied. I had traveled this route before. A letter was immediately sent off.

A couple of weeks later, I made an equally embarrassed call to Houston: in my eagerness to make the patch easy for the manufacturer to reproduce, I had completely forgotten to do a definitive version for publication! I did one quickly, in pen and ink, and shipped it off.

But Commander Kerwin had the last word. He invited me to the launching of Skylab One as a guest of the astronauts, and enclosed his check for my work.

And forgot to sign it! ■

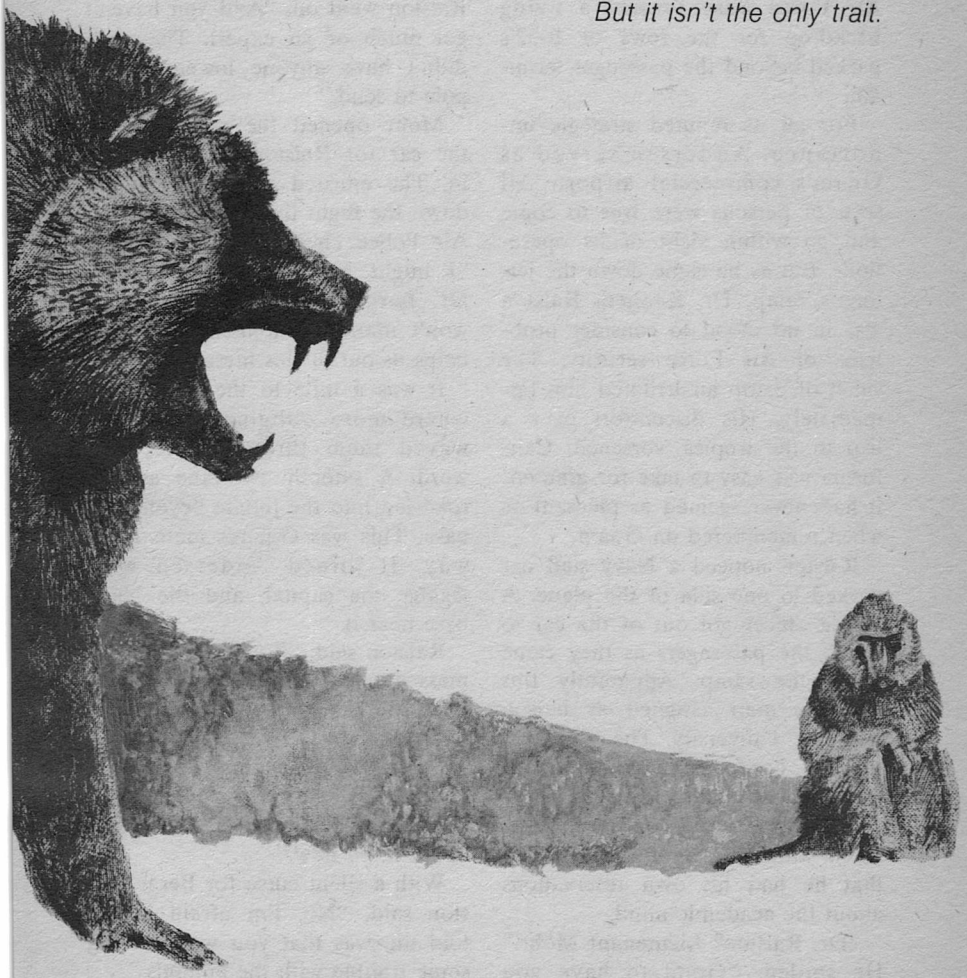

SKYLAB I
CONRAD·KERWIN·WEITZ



BERNARD DEITCHMAN

CHESTER

Aggression is one important trait of all primates, including man. But it isn't the only trait.



JOHN SCHOENHERR

I

The smell of Guam was the smell of thick vegetation. It overcame even the odors of the runway. The heavy jungle that fringed Andersen Air Force Base formed a living backdrop for the rows of B-52's parked beyond the passenger terminal.

For all its reputed strategic importance, Andersen served as Guam's commercial airport. All sorts of persons were free to come and go within sight of its operations. But as he came down the jetliner's ramp, Dr. Kenneth Ralston was in no mood to consider problems of Air Force security. The smell of damp air irritated him immediately. His discomfort over a trip to the tropics worsened. California was easy to take for granted; it had never seemed as pleasant as when remembered on Guam.

Ralston noticed a Navy staff car parked to one side of the plane. A young officer got out of the car to watch the passengers as they came down the ramp. Apparently this was the man assigned as liaison with the University. The uncertain task of confronting the military mind was at hand.

The officer had a respectful, if wary, attitude. His face suggested that he had his own reservations about the academic mind.

"Dr. Ralston? Lieutenant Mohr." He smiled. "Good to have you here. We need some expert help."

They shook hands, and Ralston said, "Thank you, Lieutenant. I'd say it was nice to be here in this steam bath, but I don't want to start off with a lie."

They walked toward the car. Ralston went on, "And you haven't got much of an expert. They just didn't have anyone lower on the pole to send."

Mohr opened the rear door of the car for Ralston, and they got in. The enlisted driver took them down the flight line and through an Air Police checkpoint. Mohr said, "I might have preferred to have Dr. Berg himself here, but that won't matter as long as *somebody* helps us out of this mess."

It was a mile to the main gate, where more obliging Air Police waved them through without a word. A smooth, two-lane asphalt road led into the jungle beyond the base. This was Guam's main highway. It joined Andersen with Agaña, the capital, and the Navy base near it.

Ralston said, "Well, what kind of mess are you in? Or what kind of mess are the baboons in, should I say?"

Mohr stared at him a second. "Didn't Dr. Berg tell you? I must have written him a dozen letters about it, by now."

With a silent curse for Berg, Ralston said, "No, I'm afraid all he told me was that you were having some trouble with the animals."

Mohr gave him a resigned look,

as if nothing Berg did could really surprise him, and, Ralston thought, as if he didn't quite believe Ralston.

Mohr said, "Dr. Berg doesn't seem to take this very seriously. Did he send you out here just to hold our hands and keep us quiet?"

Ralston said nothing. That, in fact, had been the gist of Berg's instructions to him. But Mohr did not seem to care much for handholding.

"Am I right?" Mohr asked.

"Pretty much so. You'll have to forgive Berg—zoologists sometimes forget you can't treat people like lab animals."

Mohr said, "Are you a zoologist?"

Ralston laughed. "Please—I'm a biologist."

"Pardon me." Mohr laughed with him. "But you *are* familiar with this project of Dr. Berg's?"

"I am in theory. I've never been out to the island before. The project got started before I arrived at the University. Several departments are running it, and as junior member in my department, I have to show some interest."

Mohr nodded. "Then maybe you can fill me in on some things. Mr. Skinner's the only man I've met that's connected with it, and he seems to think the whole thing is classified, and I'm some sort of spy."

"The project is hardly that serious. But I understand he's been on the island almost continuously since the project started. He's bound to be a bit eccentric by now."

"Maybe," Mohr said, a trace of doubt in his voice. Plainly, he had no love for Skinner. "He's part of your faculty?"

"No. He's had experience as an animal trainer, and that qualified him as an observer for the project."

"I see. One man and an island full of monkeys. What for?"

"What for?" Ralston asked, amused. "To get our names in learned publications," he said drily. "So we can keep our jobs."

"But you people have a defense grant for this project, so you must be doing more than keeping your jobs. But no one's told me what monkeys have to do with defense."

Ralston's expression became abstract. "They used to train monkeys as soldiers in the Far East. They were used as archers or spear throwers, I forget which. But that was before my time."

"Seriously?"

"More or less. How effective the monkeys were is another story. It was probably just a marginal affair. Anyway, our monkeys aren't involved in anything that plebeian. We're trying to start them farther back in the development of warfare—as Berg sees that development—to see if they can get to the bloodletting on their own."

Interested, Mohr said, "Dr. Berg has theories about war?"

"Plenty of them," Ralston as-

sured him. "He's an instinct theorist at heart, and, simply put, he believes that most animal behavior is genetically determined, or innate. For example, aggressive behavior is innate. Accept this, and you must accept that aggression will always find an outlet. Take animals long on aggression, like men and baboons, and put them in an environment without threatening stimulation for their instincts to act on, and they will create their own. That is, war.

"Lack of environmental danger may have something to do with war as a human institution, but it can't be the whole answer. Whether we can induce baboons to imitate their cousins by giving them the benefits of civilization—as we're attempting in this project—is also questionable.

"My guess is, given a Garden of Eden they will respond in true monkey fashion, by relaxing and enjoying it. They may squabble over sex or the ripest fruit on the tree, but real violence is out of the question unless population gets out of hand and the island becomes a zoo."

"You don't sound too impressed with this project, Doctor," Mohr said, as if he had found an unexpected ally.

Ralston shrugged. "The basic hypothesis is too simpleminded, essentially pointless. The project was born of completely outdated doctrinal arguments. Of course, were it not for doctrines, we'd have none of this military money. But it could be spent on better things."

"How did Dr. Berg get the grant, then?"

Ralston stared out at the passing jungle. Occasionally there were small collections of wooden houses by the road. "The theory behind the project is not really Berg's," he said. "It's derived from a teacher of his, J. L. Wilson, a misanthropic psychologist. You've probably heard of him, he wrote some popular books a while back."

"The name sounds vaguely familiar."

"He wrote about instincts, more particularly the violent ones. His ideas have lost ground since his exile from the universities. They tell me the exile was caused by an affair with a student. Anyway, there are only a few of his disciples left in important positions. His theories were somewhat revived recently when the Pentagon got hold of his books and saw a chance to prove that man was instinctively a killer. You know, it's Nature's Way, as well as patriotic, to kill the godless Communists, and so on."

Mohr laughed. "They never told us that at O.C.S."

"With any luck, they never will."

"You don't think baboons can prove anything, then?"

"As far as man's behavior is concerned? No. They *are* charmingly similar to us, though. They're largely terrestrial animals. By aban-

doning the safety of the trees they've been forced to develop, like man, social aggression. A single baboon, like a single man, is no match for African predators. But a gang of them can face down anything but a pride of lions. Killing on the ground by concerted action, and a high degree of social responsibility not found in most primates, are what make the baboon so enticing an analog to man. But their killing is usually in self-defense, and aggression toward each other is neatly ritualized. They may be too enticing, and we may draw some unjustified conclusions about human behavior from theirs."

"But there's such a gap in intelligence—"

"Scientists find it easy to overlook trifles like that. This project is a throwback to the simplistic thinking of twenty or thirty years ago, Lieutenant, when Wilson was in vogue. Your superiors would like to have their opinions verified by science, but they're not getting a very good brand of science. Few of us put any faith in it these days."

"You've certainly been candid, Doctor," Mohr said, as if Ralston had just performed a considerable feat.

"Compared with Berg, you mean?" Ralston asked.

Mohr nodded, and Ralston said, "I usually try to be. I'm not always this openly critical of Berg, but it sounds like he's been giving you the runaround, and I hate being sent out to catch another man's static."

"Well, I hate to make things worse, but the runaround is just the beginning of what's been going on out here."

"Such as?"

"Such as a complaint from a Dr. Isaacs, representing some U.N. wildlife agency, that the University has been mistreating a protected species on the island."

"Protected species? Which one?"

"Baboons. Aren't they protected?"

"Not that I know of. They need protection as badly as a gang of Huns. You're sure this Isaacs was legitimate?"

"That I'm sure of. He came through here about eight months ago, with plenty of identification, and a letter from the Secretary of the Navy besides. And we have to answer that letter, prove that the Navy has been cleared of any blame, or we'll never hear the end of it."

Ralston sighed. "So much for authority. How would Isaacs know anything about the island? Isn't Skinner the only person out there?"

"Yes. And the only contact he has with Guam is through our helicopter crews who take him supplies and mail. There has never even been a radio put in on the island, so he's pretty isolated.

"But I know who brought Isaacs out here, even if I'm not sure how he knew what was happening on

the island. Isaacs had a man with him from a land development company, as an interested party. It sounded funny, but I couldn't keep him off the island. He was with Isaacs, and where Isaacs went, he went."

"What was this party interested in?"

"Leasing the island from the Navy and running it as a resort, if your project could be moved out. At least, that's the idea I got."

"And hopefully the U.N. would move us out?"

"I suppose so."

They were passing through the eastern edge of Agaña. The harbor was below them as they climbed a long hill toward the Navy base.

"What happened out on the island?" Ralston asked.

"I offered to take them to see Skinner, but Isaacs wasn't interested. He didn't even want Skinner told that he had been there."

"And you never told Skinner?"

"No."

"Well, what did you show them that was so exciting?"

"I didn't show them anything. They found it by themselves. They had us cover the island thoroughly with the copter. They were mainly interested in the grasslands. As a matter of fact they seemed to have a good idea what they were looking for. We flew around until they found it."

"Found what?"

"A dead baboon—and a wounded one not far away. The live one's back leg looked broken. That real estate man thought he was being funny, and named it 'Chester'.

"The dead one had been shot, probably with a rifle. Chester's wound looked like it came from a bullet too."

They passed through the gate at the Navy base. Mohr continued, "The carcass had been chewed up by scavengers, but we took it back with us. Isaacs dug the bullet out, just to be sure of what killed it."

"What happened to that carcass?"

"Isaacs had it crated and took it back with him."

"And you never told Skinner about all this?"

"I told Dr. Berg that someone had killed a baboon, for all the good that did. As for Mr. Skinner, he probably would have just told me to go hell if I'd bothered to visit him."

"I'm not responsible for him, but while we're on the subject, has Skinner been having difficulties out there?"

"What do you mean?"

"He doesn't answer his mail too often. And when he does, he isn't very informative. I was wondering if the baboons had killed him, and one of the slower ones was answering his mail."

"Well, he's had one difficulty. He broke his leg just about the time of Isaacs' visit, maybe a few days be-

fore it. He set it himself and refused to see one of our doctors. It didn't heal too well, and he needs a cane to get around. 'Chester' has become a popular nickname. Some of the copter crews have started calling him that."

Ralston was not amused. "But there's no transportation on the island. He had to observe on foot. He can't be doing much if he's crippled."

"Maybe he never told Dr. Berg for fear of losing the job."

"Well, he's probably lost it now."

The staff car turned once more onto a flight line. It stopped in front of one of a half-dozen helicopters. Boxes were being loaded on the copter, and Ralston and Mohr stood in the sun, watching. Ralston had never flown in a helicopter and he looked the machine over suspiciously.

"All this stuff is for Skinner?" he asked.

"His usual supplies."

Ralston watched. A thought struck him. "Skinner and some baboons got hurt around the same time."

"Yes?" Mohr asked.

"It suggests things to me. Skinner might have done the shooting himself, and a monkey attacked him while he was doing it. Or, someone else went quietly out to the island to shoot some baboons, and Skinner found them. They got nervous, shot Skinner, and left."

"It's forty miles out to the island, roughly," Mohr said. "You wouldn't make it in a raft."

"I'm sure a wealthy real estate developer could afford to hire a boat."

"It's your idea. But for the record, I don't think Skinner was shot. His leg did look like an animal might have been chewing on it, though."

"You ruined my favorite of the two, Lieutenant. I was thinking that the same man who did the shooting could have stayed around to find the body. But now it looks like Mr. Skinner and I will have to have some words."

"Enjoy yourself. He's a hard man to talk to."

Mohr gave Ralston a hand up into the copter. A crewman followed them aboard and closed the door. The engine started as they were settling themselves on the cargo. They were airborne in minutes.

Their destination was an island nearly nine miles long and varying in width from one to five miles. Uninhabited by primates of any sort until five years earlier, it had at that time been turned over to a troop of chacma baboons, to do with as they pleased.

The accommodations promised to be ideal for them; there were no predators larger than a small wildcat, and only one animal large and nasty enough to stand up to a baboon, a species of wild pig. The

coasts were thickly jungled, and would supply the fruits, nuts, and shoots that made up a great part of the baboon diet. The inland savanna was a good substitute for the grasslands of Africa, where baboon troops spent their afternoons in search of roots and seeds and insects. A line of low hills ran along the edge of the eastern jungle. Here were a few bare, rocky faces such as the chacma favors for sleeping places. It was a monkey's paradise.

The helicopter made the trip in less than a half-hour. Mohr and Ralston moved to the cockpit as they dropped toward the island. They made a low trip along the coast, and saw no baboons. Mohr pointed out the collection of cabins where Skinner lived.

They crossed back and forth above the savanna. Not far from the cabins they found baboons. Ralston counted thirty-eight of them, fewer than he had expected. But it was just past noon and stragglers might still be grooming each other in the shade of nearby trees before the afternoon's foraging.

"Those some of your boys?" Mohr asked.

"Some of them, yes. They seem to be doing all right for themselves."

The monkeys were moving lazily through the grass, snooping under rocks and plucking leaves off bushes. Many of them seemed half asleep, as though just awakened from a midday nap. The helicopter intrigued a few and they stared up at it.

"Seen enough?" Mohr asked.

"Why? What's the rush?"

"I thought you'd want to see the other troop before we visit Mr. Skinner."

Ralston looked at him for a long moment. "Did I say something?" Mohr asked.

"Did you say two troops?"

"There are."

"And when did this happen?"

"What?"

"When did the troop divide?"

"I'm sure I don't know. There were two of them when Dr. Isaacs came through. Weren't there always?"

"No. Only one troop was released to start the project."

Mohr frowned. "Dr. Isaacs knew there were two troops. He made sure we found both of them."

"I'd be interested to know who he'd been talking to."

"This division is important?"

"Very. It's early for population pressure to cause a division, though not impossible. We'll have to see how big that other troop is. It is possible there were too many males the same age, and not enough status to go around."

"You wouldn't consider aggression as a cause?"

"In the form of rifle bullets? Until we straighten that out, all bets about instincts are off."

The helicopter turned away from the baboons and began its search pattern again. In the south of the island was a larger troop, moving rapidly across the grassland. Ralston had difficulty counting them. He reached a rough total of fifty.

"There are enough of them, but the wrong sex," he said.

"How's that?"

"I can see ten or a dozen adult males down there. If the original troop split over status fights, I'd expect more than that. They're mostly females and young."

"They're sure in a hurry. That other gang wasn't even awake," Mohr said.

The monkeys were not far from a grove of trees on the edge of the eastern jungle, and apparently had just left it. They were moving west, deeper into the savanna.

"No, that's not normal for them. Foraging is usually a casual affair."

Mohr brought out a pair of field glasses to look at the trees the troop had left. "Here's something else for you," he said to Ralston. "In those trees."

Ralston took the glasses. What might appear as a few lumps of shadow to the unaided eye became a group of three baboons, sitting on their haunches and picking at the ground around them.

"Three males. But one is just an older adolescent, I think," Ralston said.

"Then that adds a few adult males to this troop," Mohr said.

"But it raises more questions. Baboons stick together while they're foraging on the ground. They spread out some, but they don't leave anybody behind like this."

"Want a closer look?"

"No. It might take days to figure out what those three are doing. They might just be lazy, but I doubt it. Berg will be out here with half the faculty when he hears about this. We can figure it out then. I think I'd like to see Skinner."

The helicopter rose. Looking back at the trees, Ralston thought he saw another shadow leave the edge of the jungle and move toward them. What next?

There was a clearing for the helicopter near the cabins. Coming down, Ralston could see six sleeping cabins ringing a larger building he supposed was the meeting room and kitchen. When they had landed he could hear a generator running somewhere.

Skinner was older than Ralston had expected. His bald scalp and his face were leathery, but the tan on them was fading. His eyes were black. He was unimpressed as Mohr introduced Ralston, and he remained distant after Mohr had left the cabin. He sat at a small desk writing a letter, his right leg propped on a chair.

Skinner was first surprised, then indignant, at hearing of the U.N. visit and its results. "If I hadn't

hurt my leg, they'd never have come near the place. They must have known I was laid up," he complained.

"It's more than Dr. Berg knew. Mind telling me how it happened?" Ralston asked.

"Why should I? You're nobody to me."

"I can get you dumped off this island."

Skinner glared at him. "You don't run it."

"As far as the Navy knows, I'm a lot closer to running it than you are. If I want you gone, you'll be gone."

"Think you're somebody, do you?"

Ralston had to control his irritation before he said, "Let's try it again. How'd you get hurt?"

"Now that's the funny thing, friend. I shot that precious monkey myself. The little bastard came at me and ripped my leg open to the bone. I had to kill him."

"Some caretaker. How'd you manage to let that happen?"

Skinner was silent. Ralston said, "All right, we'll try another: who did you tell about the injury?"

"The Navy, they sent a doctor over."

"No one else?"

"No."

"You know that the troop has split into two separate groups somewhere along the way?"

"It has?"

"You didn't know? It almost certainly happened before you got hurt."

"You think I'm lying?"

"The thought has crossed my mind."

"Well, you can uncross it."

"Oh? Somebody killed a baboon. The troop has split. The two events could be related. You were supposedly the only man on the island while all this was happening, and you don't know anything about anything. But you're not lying."

"I was hurt. Anybody could have come and gone without me knowing it."

"And they did. That U.N. man knew an awful lot about this place, more than you admit to knowing. Somebody was talking to him, you can be sure of that."

"It wasn't me, friend."

"Some other baboon, maybe?"

"What did you say you were at the University?"

"I'm in the Biology Department."

"Berg sent a stiff, huh?"

"He sent someone who didn't know much about this project to start with. But I'm learning fast. For instance, I've learned that somebody has been talking to a real estate developer if he hasn't been talking to the U.N."

"Real estate? What real estate?"

"This real estate. A company wants to lease it and run it as a resort. If they can get us off for mistreating animals. Their evidence so far is a baboon you say you killed.

This company brought the U.N. out here, and I imagine they were overjoyed at what they found."

Skinner swung his leg off the chair and reached for a walking stick leaning against the wall. "You've said your piece. Now I'll tell you, I took care of those bastard monkeys as well as I could, and I don't know any real estate men."

"But are you sure you shot only one monkey?" Ralston asked with mock sweetness.

"What?"

"How many monkeys did you shoot? I forgot to mention that they didn't find just a dead one. They saw a wounded one, too. He'd been shot in the leg."

Skinner was silent. He grasped the stick and pulled himself to his feet. "I shot one monkey, and it was to save my own life. I don't know about any others."

"Fine. You can tell the same story to Berg next week and see how he likes it. You can also explain the coincidence that you were hurt just about the time the shootings happened. Thanks for the hospitality."

Ralston moved toward the door and Skinner said, "They're coming out here?"

"You know they will. You knew not to tell Berg the troop had split, didn't you? Why else keep that and a lot of other information from him, except that you didn't want him out here finding bodies?"

Skinner ignored that. He said, "Tell that lieutenant to come in here, will you?"

Ralston sat in the meeting hall with the copter crew and waited several minutes for Mohr to return from Skinner's cabin. As they took off and turned for Guam, Ralston told Mohr about his conversation with Skinner.

"Sounds like Skinner shot both those animals, doesn't it?" Mohr asked.

"It does, and that makes me think he was paid to do it. I'd like a little more information on our real estate man."

"I can get you some, but not much. I think the Andersen base paper did a small article on his visit."

"Good." Ralston noticed that Mohr carried several envelopes in his shirt pocket. "Skinner's been writing a lot, hasn't he?"

Mohr nodded, and Ralston said, "Could I see them?"

"What for?"

"Someone has been getting real good information about this experiment, and Skinner looks like the obvious source. I'd like to know who his correspondents are."

Mohr considered that, and said, "You know, in this instance, I work for the Post Office as well as the Navy. We're responsible for mail service to the island. Who he writes to is his business—at least that's the way the Post Office feels about it."

"Lieutenant, you know how I feel about Berg's theories. If this experiment proves they're hot air, as I expect it will, that won't hurt my feelings. In fact, even if we should happen to substantiate his theories, it won't really offend me much. As long as the experiment is honest.

"But suppose it's not. And suppose we publish the results of it without knowing that there has been some tampering? Because there might be more involved here than the interests of some real estate company. What if some attempt has been made to affect our results? What then?

"If the tampering was never uncovered, we'd all be fine. Wrong, maybe, but fine. If the tampering ever did come out, all the people involved—me included—could be washed up professionally. We'd be known as stupid people or dishonest ones. In any case, poor scientists.

"This experiment might be a bear trap. The thought that my reputation could get caught in it is enough to make me read the addresses on someone's mail—and worse. Can I see those letters?"

"Sure. I was just wondering if we were trying to do the same thing. I'd say we were." Mohr handed him the letters.

There were six of them. One was addressed to Berg, and Ralston wondered what useless information it contained. "Is this the one he was working on when we came in?"

"Maybe. But it's not the reason he made me wait so long. He wrote another letter while I was there, a short note. It's on the bottom."

Ralston passed over the next four letters, all to scientific supply houses. The bottom letter was addressed to Samuel Abbott, Albion Gift Shop, Agaña, Guam.

"He wrote this after I left?"

"Yes. And he wants it mailed immediately. He says it can't wait."

Ralston eyed it curiously. "Mr. Skinner is losing his touch, and what credibility he had left."

Ralston waved the letter in his hand and held it up to the light. Mohr said, "That really would be tampering with the U.S. Mail, Doctor."

"You don't think I would try to invade his privacy, do you?" Ralston handed the letter back reluctantly.

Mohr smiled. "You'd probably be interested in this gift shop, wouldn't you?"

"Have you been there?"

"I've been by it. It's a made-over house on the bluff above Agaña. Not much to look at. I'll see if anyone up front has been there."

Mohr went forward and returned with the enlisted crewman. It turned out that he had bought a gift, an artificial diamond, in the Albion. What he remembered most about the shop were odd displays

having little to do with jewelry. Ralston listened closely to his description of skulls and parts of skulls, some said to be ape, some human, he had seen in the shop.

"I wonder if any are baboon?" Ralston said, after the crewman had gone forward.

"I think we could take a ride up there and see for ourselves," Mohr said.

After they landed Mohr got a staff car and drove them out toward Agaña. He made a point of mailing Skinner's letters before they left the base.

The Albion Gift Shop was in a faded pastel stucco house, the front of which had been modified to serve as a display room. Signs in the windows advertised jewelry and souvenirs, but inside it proved to be a mixture of museum and curiosity shop.

The proprietor was a man in late middle age. He was small and white and wore a gray suit and white shirt without tie. From a stool behind a cash register he watched as Ralston and Mohr, his only customers, inspected the exhibits in the place.

In one display case there were flint artifacts, spearheads and arrowheads, and small pebble tools Ralston guessed must date from dim prehistory. Other cases contained a variety of fossil bones. The animals they came from were impossible for Ralston to identify, even when the fossils were labeled, and he supposed that most were extinct species. His knowledge of paleontology was more limited than he had thought.

Another case held more recent artifacts, pottery and tiles, knives and vases, remnants of distant historical times. But the most impressive case contained fragments of skulls and jaws. Some were labeled as human or protohuman, others as ape, modern and extinct. They were arranged to invite comparison between the human line and the ape. It was a convincing evolutionary display, and Ralston wondered how it came to be there.

They moved gradually around the room until they reached the counter where sat the proprietor. Ralston tried to make his interest appear casual, as if he were a chance tourist, but the contents of the shop nagged at him. Somewhere he had heard of such a shop, jewelry mixed with fossils. Where?

"May I help you?" The man's voice was low, and its accent suggested England.

"I was just admiring your collection here. I know very little about this sort of thing—fossils, that is—but it is a very intriguing collection. Are you a scientist?" Ralston tried to put the proper note of amateur enthusiasm in his voice.

"Something of one, when I have the time to work. This collection you see was begun by my grand-

father, and I've been able to add to it occasionally." He spoke as though the collection held no real interest for him and he took no pride in it.

"You mean you do research on Guam?" Ralston asked.

"Yes. It's been my belief for some time that quite a bit of human prehistory can be unearthed here. I have been developing some sites on the western end of the island."

"It must be exciting work," Ralston said.

"Oh yes, very," he said, without a trace of interest or excitement.

Ralston had never heard of any human fossils, or artifacts of prehistoric age, having been found on Guam. Still, anything was possible. Did any of the contents of the shop's display cases come from the island? The man's claims made his presence and that of his collection more puzzling than before.

Conversation had bogged down. The proprietor plainly had no time for Ralston's enthusiasm; perhaps its underlying hollowness showed through. Ralston noticed a business card taped to the cash register which identified Samuel Abbott as the owner of the shop.

"You're Mr. Abbott, then?" Ralston asked.

Abbott nodded, and Ralston introduced himself as a high school drama teacher.

Looking away from Abbott, Ralston noticed a skull fragment resting in solitary display on the wall behind the counter. It was the better part of a brain case, and it looked big enough to be hominid. It was brown and looked brittle, and had on its glass case a card yellow with age. Two words were there in faded ink; Ralston could read only the first. It sounded like a generic name: *Eoanthropus.* The second word was too faded to read. *Eoanthropus.* The name raised some dust in his memory. What was this creature? The name implied it was definitely in the human line, but he could not place it, and that bothered him. Something this close to human should be familiar. He shouldn't have to beat his brains to identify it—and still come up empty-handed.

Despite his curiosity, he did not ask Abbott about the skull. The connection between Skinner and Abbott had made him cautious. He did not want to appear too inquisitive. He bought a small tie clasp with a plastic imitation of a fossil human tooth on it, and he and Mohr left the shop.

"Quite a place," Mohr said, as he drove back through Agaña.

"If those displays were authentic, someone was a fine paleontologist. But not on Guam."

"I was wondering. I never heard of any fossils dug up around here."

"Too bad his collection didn't include some green baboon bones. Not that I really expected Abbott to be our real estate man."

"No. He was only in his late twenties or so. Didn't I mention that?"

"No, but it doesn't matter. Abbott is still someone I want to know more about. That shop reminds me of something I once saw or read about, but I can't remember what it is."

Mohr drove across the island to Andersen, and its base publications office. In a copy of the local news sheet dated several months before, they found the item Mohr had mentioned. It was a photograph of two men, one identified in the caption as Dr. Elton Isaacs of the U.N. Wildlife Protection Agency, the other as Mr. J. L. Wilson of Ski-Hi Properties Corporation. The latter was said to be interested in developing a tourist resort in the area. There was no story other than the caption.

Ralston pointed to the picture of Wilson and asked Mohr, "Did you catch his name?"

"I didn't when I met him, but I do now. The psychologist you mentioned, the instinct man. But this can't be him, can it?"

"Obviously not. In fact, I'm sure the name is an alias. I know 'Mr. Wilson'. He's a grad student in psychology at the University. His name is King." *And he's the protégé of Stoker, psych's main participant in the project,* Ralston said to himself.

"What would he be up to impersonating a real estate developer?" Mohr asked.

"Right now I have no idea, but we can forget about high-class tourist traps out here. Though that doesn't do much for Skinner. He shot some monkeys, only now I have no idea why." The possibility that the project had been tampered with in order to produce a specific result came immediately to mind, however. Somebody wanted to doctor it, but who? Skinner himself? Ralston did not think it likely. He could not imagine what Skinner would have to gain from it.

There was Berg. His delaying tactics in dealing with the Navy hinted he might be hiding something, that he wanted no attention drawn to the current state of the project. There was also Stoker, now. Where did he come in? It seemed that he might be working at odds with Berg, trying to bring some notice to Skinner's activities. But why resort to such games as having King running around under an alias?

Ralston found himself without an antagonist, though he had three candidates. Four, if he counted Abbott, who might or might not have anything to do with the tampering, who might just be a friend of Skinner's and no more.

Ralston said, "When can I get a plane out of here?"

"You're leaving?"

"Yes. I don't think I can do much more good here. I want to

see Berg, and I want to find out what King's business was out here."

They left the news office and drove to the passenger terminal. Four hours later, Ralston managed to get a seat on a transport returning from Japan. He promised Mohr that he would let him know what he learned.

II

For more than four years the baboon troop that Berg had taken to the island lived idyllically. They foraged where they liked, with no competing troops to incite their territorial inclinations. They had no need to attach themselves to a certain part of the island, and considered all of it loosely theirs.

A new troop's appearance in the north of the island breathed life into their sense of property. Encountering each other to their mutual dislike several times, the two groups settled on a division of the island. The settlement, though noisily worked out, lacked any violence. When the screeching was over, the old troop owned the southern two-thirds of the island. The rest went to the newcomers.

The southern troop had no time to adjust to this accommodation before the killing began. In a few days, the troop saw half its members murdered.

Among the animals spared were three named Leroy, Muggs, and Hamlet. Their names came courtesy of Stoker. Every baboon troop—except for the family groups of the hamadryas—is an oligarchy, and these three were the ruling clique of the old troop. Their survival ensured that the troop would keep its cohesion and its territory in the face of slaughter.

Leroy was most powerful within the triumverate. He had the attributes necessary in a baboon leader: an even temper and the courage to meet every situation without alarm, and the willingness to be in front when the troop faced danger. He settled disputes with a cool stare and the manners of a gentleman. Only in extremity did he discipline a member of his troop loudly or physically.

Hamlet warranted his name. He was an erratic creature who knew little of the demands of leadership. His temper was mercurial. The only qualifications he brought to the triumverate were a desire for dominance and an impressive physique. Too often he handled minor problems hysterically, and was irresolute when a situation demanded vehemence. Despite these traits Leroy had learned to use Hamlet's size and fury in the interests of the clique.

Muggs was a large but otherwise nondescript animal. He had learned early in life a role as Leroy's aide. He was a faithful, stoic soul, whose courage was as great as Leroy's but whose brain was considerably

slower. As juntas went, they were no nastier a collection than most.

These three, especially Leroy, were faced with the deaths of their fellows, and the question of its cause. For most of their lives they had been protected from human predation, and knew nothing of the uses of a rifle. They were mystified as friends and relations dropped in their tracks. But baboons in Africa had long known the significance of a rifle in a man's hands, and it did not take Leroy long to learn that lesson.

The sight of their attacker soon sent the troop running, and the man's job became more difficult. When he chanced a long shot, and wounded a male in the hind leg, Leroy and Muggs themselves ran back to carry the victim to safety.

Baboons will carry a hurt fellow out of immediate danger, but they do not care for the sick or wounded, or mourn their dead. When the killing stopped, they forgot its victims, including the straggler they had left behind with a broken leg.

Chester nursed his wound alone. In an environment laden with predators he would not have lived a week. He might have huddled in a tree, but only until a leopard found him. On the island he could tuck up his bad leg and hobble along on the other three without fear. He became that primate rarity, a solitary baboon with a chance of survival.

Until the wound closed he stayed in some brush and dug for roots and insects. It was here that Isaacs and King saw him. When the wound healed he began moving out from the bushes in search of other food. Months later the bone itself mended. It would always be twisted, but he could limp along without much pain, and he set out to rejoin the troop.

The day he found them, it was Hamlet who noticed his approach and charged out to meet him, snarling. Hamlet's memory, no more reliable than his temper, told him Chester was a stranger. But the stranger refused to be intimidated; he behaved as though he belonged to the troop. Hamlet's fury evaporated. He screeched sharply at Chester once, and sat back in confusion, scratching himself, to await the arrival of Leroy and the other males.

Hamlet urged the immediate disembowelment of the intruder to Leroy. But Leroy recognized Chester, and elbowed his cohort away. Hamlet was outraged by this snub. He turned on some of the other males and distributed several slaps and punches. In his anger he cuffed Muggs without knowing it, and received a foot in the stomach for his inattention. Leroy separated them with a rare snarl that sobered the whole group.

Chester saw that Leroy recognized him. He presented his rear

for mounting, in acknowledgment of Leroy's status. Leroy, however, was fascinated by Chester's limp and only absentmindedly slapped him on the back. A crippled baboon who had survived his injury was a novelty, and Leroy sat down to contemplate Chester.

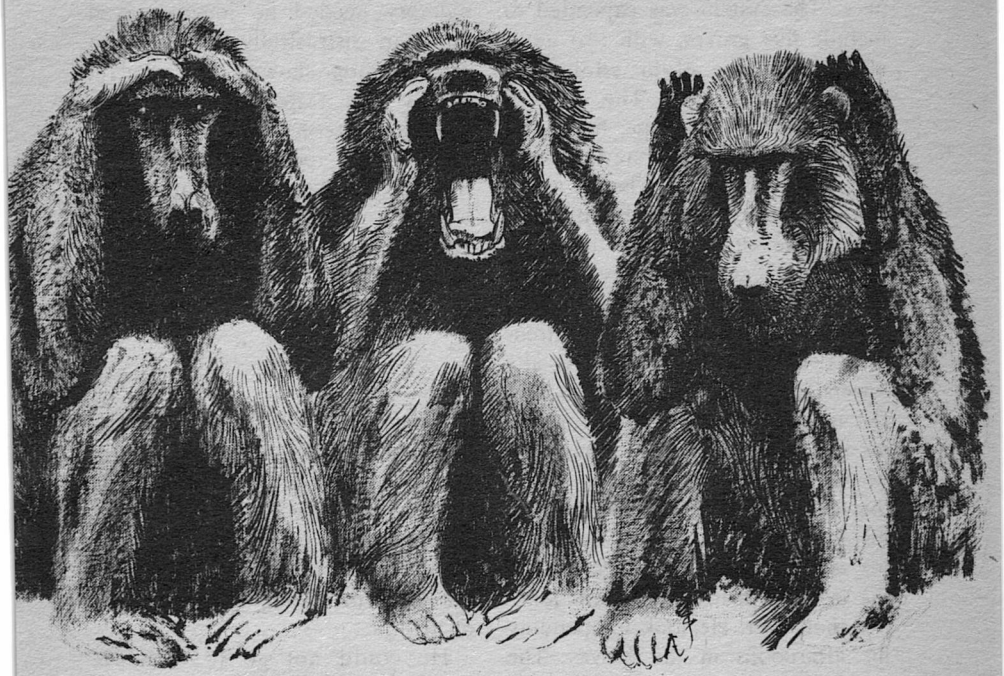
Foraging is a leisurely activity. A troop may cover a few miles in an afternoon, but no more than that. The baboon diet being catholic, food abounds for them. Calm and complacent, baboons accept the pace set for them by their leaders without question. When the clique rests, everyone rests, settling down to doze or groom one another. When the clique moves, everyone moves. And when the clique suits itself to the pace of a cripple, everyone does.

Leroy tended to his duties in the weeks that followed Chester's arrival, but his fascination with Chester was constant. He kept the cripple near him and spent hours watching his limp. His imitative capacities gave him a glimmering of something to be learned from Chester's survival. But the picture was incomplete, and had to wait for time and chance to fill it in.

There were several groves of trees in the southern troop's territory where a kind of wild yam grew. The monkeys had acquired a strong taste for them, and never got their fill, for the groves had other visitors. It was in one of these groves that Leroy completed his vision.

The troop had been rooting in the grove for some time. Leroy was ready to leave. Most of the troop left quickly with him, but a few adolescents lingered in the grove. This was not unusual, but when Leroy looked back at them he was in his own simple way possessed of a gestalt. He saw the young baboons in the grove, and he turned to see Chester limping beside him. The picture was complete. Monkeys could survive away from the troop. Monkeys in the yam groves would ensure a constant supply of treats for the troop. Leroy was the first monkey farmer.

It needed all his authority to convince three adult males to remain in the grove while the troop moved on. The baboon sense of



time being limited, there was no way any of them, Leroy included, could deal with the question of the troop's return. Intuitively Leroy knew he would be bringing the troop back soon, but "soon" was a concept beyond the ability of the most intelligent baboon to communicate.

In the end they left three disconsolate waifs behind, and it was only the start. Within a few days the three most fruitful groves were staked out. The troop centered its movements around them, relieving the guards frequently. The yield of yams went up sharply, and the troop grew to appreciate the wisdom of Leroy's system.

Predictably, setting up the guard system satisfied the itch Leroy had felt whenever he watched Chester walk. Chester was forgotten as Leroy put as much concentration into his new duties as a grand master might into a championship chess match. The troop no longer set its pace by Chester's limp. In fact, it moved faster than ever. Leroy's concern over the need to change

guards regularly dictated the new pace. The system was expanded to include five groves, with two adult males and one older adolescent male guarding each. The days of lazy foraging were gone, but feasts of yams made up for the loss. And with this new pace Chester often found himself hours behind the troop. He only caught up with them at twilight, after they had settled into their cliffs to sleep.

Chester had enjoyed the attention Leroy had given him. As any lower-ranking male might, he had felt uneasy with it at first, for fear he had angered Leroy. But when he saw that Leroy meant no harm, the attention was flattering. After his long exile, it came to be intoxicating. When it was gone, and the troop with it, Chester was lonelier than ever. He took to spending his afternoons in the groves. The guards, usually bored, enjoyed his company, but they were a poor replacement for the troop itself.

During Chester's new abandonment, Ralston made his trip to the island and caught a distant glimpse of the cripple. The helicopter interested Chester, but did not alarm him.

Late in the morning of the second day after Ralston's visit, as the troop prepared to leave its sleeping quarters in the rocks, a man approached on foot carrying a rifle. Chester fled into the brush before he was seen.

The hunter watched the monkeys from a distance. Leroy, whose memory needed no jogging, eyed the man distrustfully, but the rest of his troop showed no concern. Warily, his responsibility for his guards overcoming his desire to stay in the rocks, Leroy led his troop off on their daily rounds. The hunter followed, but made no attempt to harm anyone. Chester came out of hiding and followed the hunter.

III

Ralston flew through the night. He reached his apartment after sunrise, tired and confused. The sleep he had got on the plane had not refreshed him, and two trips across the Date Line left him with the sense of having lost a day out of his life.

He could not go to bed. He shaved and showered, had breakfast, and at nine-thirty was in Berg's office summarizing his trip.

Berg took the news of Skinner's injury gloomily. His mood got no better as Ralston told him of the U.N. visit to the island.

"This Isaacs was legitimate?" Berg asked.

"Apparently."

"I don't know—this whole complaint sounded funny to me from the start. When the Navy wrote to me that someone had shot one of the monkeys, I wrote and asked Skinner about it, and he told me it was self-defense. The animal at-

tacked him. There was nothing more to it than that."

"You knew about the shooting before you sent me out there? Why didn't you fill me in a little better, then?"

"I'm certain I told you all I thought you needed to know."

"That wasn't enough. Anyway, there's quite a bit more than you knew, if Skinner was your source of information." Ralston told him about the real estate developer. He did not mention that he knew the threat of competition for the island was imaginary. He wanted to hear Stoker's side of that story first.

The imaginary threat angered Berg. "The Navy is probably behind this. All they've done is harass me."

"Then maybe the Navy shot the other monkey, too."

"What other monkey?"

Ralston described his meeting with Skinner.

"You really think Skinner shot more than the one he says attacked him?"

"Well, I got quite a reaction out of him when I told him about the second one."

"But maybe he shot the second one and doesn't remember. After all, they were attacking him."

"I think he's lying."

"Why?"

"Because I think he may be trying to tamper with the experiment, and the shootings could be part of it."

"Tamper with it? To what end?"

"See for yourself," Ralston said, and he went on with the information he had saved for last, the news that the troop had divided. Though he tried to impress upon Berg his suspicions regarding its origins, the news of the division banished Berg's anger over the real estate company. He would not consider it possible that the shootings were at all involved in the division, or that tampering of any sort had taken place. The more he savored the news, the more excited he became. A man whose faith in his own ideas was all powerful, Berg needed only a hint of proof to take him to dizzy heights.

Ralston cut his report off there. He did not mention the odd behavior of the three baboons in the second troop. The possible implications of that were best left untouched at the moment. There might be nothing important in it at all.

"Well, then, you've convinced this lieutenant that we haven't been mistreating the animals?" Berg asked briskly.

"Not really. He thinks Skinner's lying too."

"But it was self-defense. They've no complaint with us."

"Then why not tell them that? All they wanted was somebody to talk to them. Skinner won't. You won't. You act like you've got something to hide."

"I've nothing to hide from any-

one. I simply have no time for such nonsense. Skinner's word satisfied *me.* All the rest sounds like much ado about very little." Berg paused, looked up at the ceiling as if he were doing a problem in long division in his head. "Now. We need to get ourselves organized. With people gone on grants for the summer, it may be just you and I and Stoker and some graduates at first, but we must get over there soon and try and reconstruct what's happened. It's a shame that Skinner got hurt. We've missed so much."

It seemed to Ralston that Berg took the loss with no great grief. He said, "We may have missed too much already."

"You made that point already. You really believe there's been tampering?"

"Yes. All the wishful thinking in the world won't explain those shootings."

Berg would not have his enthusiasm dampened. "Back on Skinner? Look, I've known him for some time, and I trust him. These shootings are regrettable, but I doubt that they will have much bearing on the results of the project."

The question was closed. Ralston promised to be ready to leave for the island at short notice, and went to find Stoker.

The Psychology Department was in the basement of the building. Ralston hiked downstairs. The only person in the lab was King. He was standing over an alley maze, holding an albino rat to his chest, talking soothingly to it.

"Dr. Stoker around?" Ralston asked him.

"Sure, out in the rat house."

The department's animals were kept in a small concrete outbuilding. Stoker was alone with his rats. Ralston had the impression as he entered that Stoker had somehow been communing with them. Dozens of red eyes stared coldly out from ranks of drawer cages at Ralston. Rat psychology, he thought to himself. Freud and the rat-men.

"Well, hello, Ralston. Have a nice trip?" Stoker was thin and dark. His face was almost always bland, his voice neutral.

"I don't like the tropics. Otherwise it was all right."

"And how is our project doing?"

"Fairly well. I see things are still jumping in psychology."

Stoker indicated the cages. "Always plenty of volunteers." He pulled a cage out and lifted a rat from it. "Meet Fat Simon, the local champion."

Fat Simon was big and healthy, but not at all fat. He was cocky. He hung easily from the front of Stoker's lab coat and sniffed at Ralston.

"Champion what?"

"Name it. Maze runner, bar presser, stud. A hard man to beat."

"Your boy in there—King, isn't it?—is he using Fat Simon?"

"For some preliminaries. Simon's a little too experienced to be used in real testing."

Ralston eyed the rows of cages casually. "I know this will sound funny, but you wouldn't know if King has been to Guam anytime recently, would you?"

"Guam? Why do you ask that?"

"Because I saw a picture in an Air Force newspaper there of a man named J. L. Wilson, which is probably a common enough name, but the man looked a lot like King without a beard. Of course, this 'Wilson' was supposed to be a real estate agent of some sort, not a psychologist."

Stoker said nothing, rubbed Fat Simon's fur lightly.

"Naturally, it didn't have to be King. And even if it was, you're not responsible for what your students do in their spare time, are you? But using that particular alias has your touch to it, Stoker, it's unmistakable. You like to play with names."

Ralston looked at the rat cages. Poking his nose from the cage he shared with Fat Simon was another large male. The tag on the cage said his name was Garfunkel. In a cage down the row resided the slowest rat in the house, and Stoker had named him Portnoy. Two others sharing a cage were named Pasteur and Lister for no easily apparent reason. Higher up the rack lived the only hooded rat, and he was named Robin Hood.

Stoker smiled at his charges. "Why shouldn't they have names?"

"Sure, why not? But about King—"

"Have you mentioned this about King to anyone else?"

"You're the first. I imagined you'd have something interesting to say about it."

"Have you seen Berg?"

"Yes."

"But you failed to mention King? Maybe you had reason to think King was doing something that needed to be done, even though under false pretenses? And that it might not seem that way to Berg?"

"Maybe, but I'd like to know just what he was doing."

Stoker let Fat Simon slide off his hand into the open cage. "He was trying to expose a hoax before it progressed too far. Thanks to Berg sitting on the Navy's complaint for eight months, it may be hard to prove as much now as it would have been then, but not impossible. I'd guess that you have some ideas about it yourself, don't you?"

"I've got plenty of ideas. Go on. Describe this hoax."

Stoker's voice was still calm, his face unmoved. "There are two troops on the island, aren't there? I knew there were two of them just after Skinner did, about nine months ago. Which was when he released the second troop on the island."

"Those two troops don't derive from one earlier troop?"

"No. It would be nice for theories of aggression if they did, but they don't. Skinner got the second troop from the same supplier as the first, and planted them for us to find at some future date."

"How can you be so sure of that?"

"I know several animal suppliers. The ones I know best I asked to keep an eye out for orders of chacmas. I wanted to know where they went. It wasn't hard to find out about Skinner's order."

"But how could he pay for them? With University money?"

"I'm not certain."

"But Berg would have to O.K. that money."

"If it was University money," Stoker agreed.

"If this is all true, you showed pretty fair foresight in looking out for that second shipment of monkeys. Why did you do it?"

"I had pretty fair foresight," Stoker said, smiling.

"Or a suspicious mind."

"Possibly. So?"

"So this project is a little more involved than I thought. All right, go on. You sent King to Guam to bring attention to Skinner?"

"Of course. I had to get things stirred up somehow." Stoker was losing his blandness. "It was about a month after Skinner set his new troop loose. It seemed to me that if he were to introduce a new troop—and pretend it was part of the old one that had broken away, the only possible reason for introducing it—he would have to thin out the old one. Natural population growth couldn't account for all the animals he would have if he didn't. That meant killing some of the original troop. I counted on him doing a slow job of cleaning up. I was right. King found a corpse.

"He also saw a crippled animal that had been shot but got away somehow. If it's still alive, it will be more proof. I hope to corner it and show it to Berg, once we get over there."

"It may be dead by now. Why didn't King try and help it then?"

"Neither he nor Isaacs had the equipment to knock it out. Ever try to dig a bullet out of a wide-awake baboon? They had to leave it alone."

"Well, we'll be going over there in a few days. Let's hope the beast is still alive."

"Berg's finally going back?"

"This apparent division of the troop was too strong to resist. But tell me about this Isaacs. Was he a fake too?"

"Oh, no. He was real, but another friend of mine. I had hopes his authority would make the Navy light a fire under Berg. And it did. The Navy has been touchy about its—what should I call it?—ecological image since the affair with the gooney bird nesting grounds on Midway. Berg tried awfully hard to

ignore them, but I think they threatened to run us off the island if he didn't talk to them."

Ralston paused, thinking of what he had told Mohr about scientific reputations. "From what you've said, the project is washed out already."

"I would say so," Stoker assured him.

"But you haven't told Berg all this."

"No. I'm not sure how much he is involved in what's happened on the island."

"You don't think Skinner is doing this on his own?" Ralston asked. He was interested to see if Stoker had any hint of Abbott's existence.

"Skinner's the only one I'm certain of. He may have help, but I don't really know."

"Skinner is just the hired man. What's in this for him?"

Stoker glanced at the rat cages. "That's the point. That's why I haven't told Berg anything."

"But anyone could have put Skinner up to this."

"Anyone? Who else would have as much to gain by such a hoax as Berg would?"

"I don't know, I'm just talking. But if we went to Berg with this now, it wouldn't make much difference who was doing the tampering. If it is Berg, he couldn't very well keep it up. And if he's not involved, we'd have some help in clearing it up."

Stoker's face soured. "I don't think we should. Let the hoax play itself out. We can expose it when we know the full extent of it."

Ralston thought that Stoker did not believe Berg was in on the hoax, yet Stoker plainly wanted Berg kept uninformed of the events on the island. Why? Ralston said, "By then it may be too late for all of us, if we've published. Why not stop it now, and avoid the grief? Why let the experiment go completely to ruin?"

"I suppose it would be a shame if something got published, wouldn't it? Still, I'd rather wait it out."

"You're awfully loose with other people's reputations. Do you *want* Berg embarrassed?"

Stoker sounded disappointed as he said, "I thought we could see eye-to-eye on this thing, Ralston. Now I'm almost sorry you caught on to this fraud. I can't see any reason for sympathy toward Berg. He entrusted the entire project to Skinner, against other advice. If that doesn't impress you, it certainly places all responsibility for anything that happens out there completely on him."

"Friendly, aren't you? You and Skinner. Did you learn your sense of loyalty from him?"

"Oh, I know Skinner, but there's very little we have in common. You know, if you take what I've told you to Berg, he won't love you for it."

"Probably he won't. I'll think about your arguments. Maybe I'll even be convinced."

Ralston left him staring moodily at his rats. He took his solitary ignorance to the library. He hoped to refresh his memory concerning Abbott and *Eoanthropus,* and planned to look into Stoker's background at the University. Events might be there that would explain the psychologist's attitude toward Berg.

He began his work in an anthropological dictionary. *Eoanthropus* was not listed. He tried a volume of primate taxonomy. Nothing. He tried three more sources, with the same result. This irritated him before the significance of it struck him. He knew now what *Eoanthropus* was, and he knew where he had read of it and of a shop like Abbott's.

He located the book he wanted quickly enough, once the pieces had fallen together in his memory. The pages he turned to sounded familiar, as though he had read them recently instead of a decade before. What he read confirmed Abbott as an excellent antagonist. He took the book with him to check out.

His research on Stoker took longer. The current school catalog told him that Stoker had taken all his degrees at the University. After receiving his Ph.D. he had taught in the East for three years, then returned to take a position at his alma mater. That had been twelve years ago. Stoker was now a full professor, second ranking man in the Psychology Department.

With this information, Ralston began checking through the back files of the school newspaper. He had no idea what he was looking for, was not even sure there was anything to find. He started with the issues from Stoker's days as a student, scanning the front pages quickly. It was a tedious job, but he was certain he had what he wanted when he came across an issue from the time of Stoker's doctoral presentation.

There had been an uproar over Stoker's paper. The newspaper had covered it all with a vengeance. A good psychologist of the period, Stoker had done his research in the field of learning. In the concluding remarks to his paper he had taken a few passing shots at instinct theorists. One of these was Wilson, and Berg, already head of the Zoology Department, had taken offense. He had branded Stoker unqualified to evaluate Wilson's theories, and hopelessly bigoted as an enthusiast of learning theorists anyway. But Berg had gone too far in hinting that Stoker's research was not original. This had brought a demand from Stoker's sponsor that Berg provide some specifics or eat his words. With bad grace, Berg managed an apology to Stoker.

The school had awarded Stoker his degree without any official notice of the controversy. In a final

footnote to the brouhaha, the newspaper had interviewed Stoker. He was quoted, "Dr. Berg has entirely too much stock in Wilson's doctrines. My data disagree with those doctrines, so my experiments must be suspect. But theories have to agree with facts, and not the reverse, as Dr. Berg seems to believe." It had been a brash thing to say. It was even more brash to return to the University as a member of the faculty, Ralston thought.

The dispute clarified things. Was it enough to explain Stoker's apparent desire to see Berg fall into an experimental morass? And could Stoker be working with Skinner to create that morass? Ralston gave up his research with a more complete picture of what went on below the surface of the project, but with a lot still missing from it. He was too tired to do anything further, and had no other ideas that could be explored immediately.

He went home and wrote a short letter to Mohr. He explained what he had learned about Skinner's activities from Stoker. He asked Mohr if it would be possible to confirm Stoker's claims about the origins of the second troop. He took the letter out and mailed it, and came back for a sandwich and went to bed.

IV

Ralston looked down the helicopter flight line and sniffed at the moist air. The humidity was making him edgy again. No matter what Dart and Leakey might say, he found it hard to believe that any ancestors of his had evolved in tropical Africa.

To add to his displeasure, he had been unable to speak to Mohr without Berg or Stoker overhearing. He would have to wait to learn the results, if any, of his letter.

Berg had brought equipment and supplies enough to fill two helicopters. The University party would fly over with the first load and Mohr would return with the helicopter for the second.

Besides Ralston, Stoker, and Berg, only a graduate student in biology, Malone, had made the trip. Other faculty and graduates who could have helped had commitments for the summer.

As they boarded the copter Stoker looked over at the boxes of dog candy Berg had brought as treats for the baboons. He said, "I feel like we're going to Manhattan with twenty-four dollars in beads."

Ralston was too irritated at the sweat forming on his neck and arms to answer.

As the island approached they squatted on crates and peered out the tiny windows in the cargo compartment. The helicopter circled above the southern grasslands and soon found some baboons. The monkeys were moving briskly, headed east. The men crowded into the cockpit for a better view. Berg

had his binoculars trained on the baboons immediately.

"Stoker, have a look at the front of the troop. See anyone familiar?" Berg asked.

"It could be Hamlet. I'm not sure, it's been so long since I've seen him."

"I'd bet it's Hamlet," Berg said. "I've never seen a larger monkey. I always thought his father was an ape." Berg laughed at his dull humor. His excitement was as high as when he had heard there were two troops, and going higher. He stared at Hamlet as if the baboon were a bequest from a rich relative. "It's Hamlet, no doubt of it."

"I'm surprised the oaf is still alive," Stoker said.

Berg was too engrossed to answer, and Mohr had to ask, "Can we go on, Dr. Berg?"

"Wait. Would it be possible to land about a half-mile ahead of them?"

"I suppose so."

"Good. There's plenty of the afternoon left to work with. I'd like to start observation immediately. Stoker, Ralston, what do you say to taking this troop? Malone and I will take the other when we find it."

Ralston thought the idea putrid; he wanted a night's sleep before risking sunstroke. But Stoker gave a vague agreement and Ralston could not refuse. Berg's excitement was becoming too feverish to argue with.

They landed well in front of the troop. It was agreed that the helicopter would return to pick them up just before sunset. Stoker and Ralston loaded themselves with Navy canteens, fresh fruit, cartons of dog candy, field glasses, a compass, and a .38 revolver apiece. Berg nervously admonished them to use the guns only in direst straits.

Mohr gave them one of a ream of mimeographed maps of the island Berg had brought along. He marked a small cross on it. "We're here, maybe a mile and a half from this jungle to the east." The cross lay along the widest part of the island. Mohr smiled cheerfully as he opened the hatch for them. "Have a nice hike."

Ralston ducked out the hatch, Stoker behind him. The sunlight struck him. He felt weak, trembling in the heat and the backwash of the rising helicopter.

"The old bastard's still quick on the uptake, isn't he?" Stoker asked.

"What's that mean?"

"He got what he wanted, a chance for a few words alone with Skinner before he sends the copter back for us tonight."

"You went along with him pretty readily, I noticed."

Stoker was resigned to their fate. "Oh, he would have got his way no matter what. I was just making talk. And we may as well get used to walking. There's no other way to get around but the copter."

Ralston merely nodded irritably.

"I take it you never had any more words with Berg?" Stoker went on.

"No."

"Good."

"You still think Berg can be duped into publishing a bad experiment, don't you?"

"Duped? You said yourself that Skinner is only hired help," Stoker said.

"But anyone might hire him. You, for example."

"True. But why would I?"

"Beats hell out of me," Ralston lied.

They sat down on a small rise. The grass around them was about two feet high. Without using their glasses they could watch the baboons coming toward them.

The troop was less than a hundred yards away when Stoker said, "They're moving awfully fast."

The leading animals were males. They were spread along a wide front. They loped along purposefully and paid no attention to the men watching them. Behind them came females, juveniles, adolescents, and then another line of adult males.

They passed in front of Ralston and Stoker at a distance of twenty to thirty yards. Stoker said, "They aren't even trying to forage."

"They've got places to go and people to meet."

"Maybe. But they might be scared of us, and the copter. This is the troop that Skinner thinned out."

"So you say. They don't look scared," Ralston answered.

"Oh? Well, how many adult males do you see?"

Ralston took some time counting. "Ten."

"Not many, for a troop this size. And the order of march is upset. The males are either in front or in back, none of them with the females and infants. Not enough males to go around, I'd say."

Ralston almost told Stoker about the three males he had seen idling in a grove, but he decided not to. Wait and see if they were still up to those tricks.

"All right, they're missing some males. You think it's because Skinner didn't watch who he was killing?"

"Exactly. He thinned out too many males."

They gave the troop a comfortable lead, and started after it. Reaching the line of march, they found that the grass was beaten down. A path, irregular in width but unwaveringly straight, ran east to west across the savanna.

"How about this, Stoker? They must use this trail regularly. It's a real monkey highway. Still think they were moving fast because they were scared?"

"Then what are they up to?"

To the east, the baboons were shrinking from sight quickly. Ral-

ston said, "I don't have any idea, but we'd better get after them. They mean business."

When it was evident that walking would not keep them close to the troop they started to jog. But the pace was more than two academics nearing middle age could manage for long. They collapsed and cursed the monkeys out of sight.

Twenty minutes of rest, some water and fruit, and they felt strong enough to start after them. Following the trail they came upon the troop gathered in a grove of trees.

Stoker took out his field glasses. "They're digging for something, maybe some kind of tuber."

Ralston was counting monkeys. "And there are three more of them than there were when they passed us."

"What?"

"There are fifty-one of them in there. After I counted those males earlier I counted the rest of them too. There were forty-eight."

"How could that be?"

Ralston was content to look innocent and puzzled and say nothing.

In the center of the grove most of the males were gathered in a close group. There was much activity among them, amiable jostling, slapping, nudging. "It looks like Alumni Day down there," Ralston said.

The males broke up with more gestures of amity. Everyone rooted among the trees for some time, then the troop began to form for travel. When they started east again they left three males behind.

"What the hell?" Stoker demanded, as if the monkeys had insulted his intelligence.

Ralston was quiet, and Stoker asked, "What do you think? Were they waiting here for the troop?"

"Apparently. If not them, three others."

"Baboons don't leave people behind. I'd give a lot to know what these beasts have been up to out here."

"Don't you think this is another of Skinner's tricks?"

"No, how could it be? I think this is significant, but what good is it to us?"

"Given time we might figure out how it happened."

Two of the baboons settled down for a nap. The third sat on his haunches and solemnly surveyed the grove.

"What is he doing?"

"Nothing but day-dreaming, as far as I can tell," Ralston answered. "It's going to take days to catch on to them. Why don't we follow the troop?"

"You think there's more of this?"

"Why not?"

They marked the grove's position on their map. Stoker estimated they were a mile from the eastern jungle.

The troop was moving fast, and a brisk walk kept them in sight

only a few minutes. Ralston and Stoker had to rely on the trail to find them again.

They caught up with the baboons in a grove immediately near the jungle. "Fifty-one," Ralston said after a quick head count.

Stoker sat down in the shade of some bushes. "What is so great about these groves?"

"It must be the roots. They haven't been eating much of anything else. They've been moving too fast for that."

"Must be pretty tasty roots," Stoker said.

"They wouldn't be guarding them for nothing."

"That has occurred to me. And God knows there's enough other food around."

Ralston said, "The question is, what are they being guarded against?"

"Weevils," Stoker said, and took an orange from his pack.

"Losing your patience, Stoker?"

"No, I lost my patience with the way this experiment has been run a long time ago. The monkeys, bless them, are doing wonderfully out here. But what good is any of it?" Stoker ripped at the orange skin.

"If we could get Skinner to tell Berg what's been done here, we might still salvage the thing. We get Berg down to earth and we can run it properly."

"Meaning we ought to tell all to Berg?" Stoker asked around a mouthful of orange.

"I'm sure he's not behind the hoax."

"Oh? Can you prove it?" He spit seeds juicily.

"I'll be able to soon."

Stoker stared at the monkeys rooting happily in the grove. "Look, they're still eating leaves and grass along with the roots. They're not completely deranged."

"I don't think they could live without some greenery."

Stoker finished his orange. "Well, you get your proof and we'll talk about it. I owe that son of a bitch nothing, but this is too beautiful to lose. These monkeys are on to something."

The troop left the grove and turned south. As before, they left three males behind. To follow the troop might mean not meeting the helicopter before dark. They chose to stay with the three in the grove awhile and then start back.

They moved closer, and their presence did not bother the guards. The baboons only looked at them with mild interest.

"Think they'd like some dog candy?" Ralston asked.

"They'd probably like some fruit better."

They came in among the trees with the monkeys. They got within twenty feet of them, moving slowly, and Stoker tossed their remaining fruit to the monkeys.

The guards scrambled for the fruit, sniffed it, rubbed it, licked it.

Finally they devoured all of it and came closer, looking for more.

"They haven't forgotten how to mooch, anyway," Ralston said.

"Let's hope they like dog candy."

The monkeys approved of the candy, and were munching at a boxful when Ralston noticed motion among the trees. He turned and saw another male looking out at him from deeper in the grove.

"Stoker, look there."

Stoker turned. "Who's he?"

"A friend of theirs, I guess. Maybe he'd like some candy."

Ralston threw candy at Chester, but one of the guards jumped after it. Stoker got the guards' attention by rummaging in his pack, and Ralston tried again to get some candy to Chester.

Chester looked carefully at the offering. He eyed the men, saw no rifles, and decided to try the candy.

"It's the cripple," Stoker said.

The candy tasted good. Chester ventured closer. Eventually he came up with the guards, looking for more.

"He must have been here waiting for the troop," Stoker said.

"Didn't King name him Chester?" Ralston asked. "I guess it'll stick. I wonder what the odds are he's mixed up in this guard system?"

"You think he is? Maybe, but how do we find out? God knows we've got our work cut out for us." Stoker threw Chester a piece of candy. "Hiya, Chester."

When the candy ran out they reluctantly left Chester and friends and hiked back along the trail. The copter met them at sunset and flew them north to the cabins.

Mohr came out of the meeting hall as they landed. Stoker was first out of the copter. "How long has Berg been back?"

"About half an hour," Mohr said.

"He's with Skinner?"

"Yes."

"Well, I think I ought to pay my respects to brother Skinner, too."

Mohr pointed out Skinner's cabin to Stoker and watched him walk off. "Whose side is he on?"

Ralston said, "His own, but I have hopes of getting him to lay off Berg."

"Lay off him?"

"There's more to things than I told you in the letter."

They went into the dining hall for coffee. While they drank, Ralston filled in Stoker's background at the University for Mohr.

When he was done, Mohr said, "The Navy hasn't been too happy with Dr. Berg, for that matter."

"I can understand that."

"Even if Dr. Stoker did put Isaacs up to his investigation, we have to take the U.N. complaint seriously. We haven't always been popular with conservationists and that crowd. We can't have any charges of mistreating wildlife stick. If Skinner is to blame, I'm going to see that the U.N. knows about it.

"And I don't think I can trust Dr. Berg to see that all the facts are made public."

Ralston said, "Then Stoker's claims are true?"

"Completely. Skinner had at least forty baboons shipped to this island nine months ago. They were brought over from Guam by the same fisherman who brought over your first bunch.

"After Skinner was hurt, he had this fisherman hire some local labor and bring them out here. They were paid to collect the bodies of some baboons that had been shot, and bury them. When this fisherman got curious about the shootings, Skinner told him the baboons had a virus and had to be killed. The new monkeys were supposed to replace them. It's a nice story."

"Except that Stoker anticipated it."

"And he won't say how?"

"No."

"Well, you see what I'm getting at. I caught hell today when I told my boss about that second shipment. He seems to think I should have known about it when it happened."

Ralston tried to look sympathetic. "Tell him you weren't the only one who got taken. We weren't too alert either."

"Yeah."

"And I don't think the damage is irreparable. The experiment can be kept going, once we get rid of Skinner—and if I can prove what I think Abbott's up to. It'll bring Berg down hard when he hears what Skinner's done, but that's what we need."

"Oh—speaking of Abbott, he just got out of the hospital today."

"The hospital?"

"You won't believe what happened to him. He says he came over here to visit his friend Skinner, and fell into a ravine while he was out for a stroll. His leg was really chewed up, but I guess it wasn't as bad as it looked. It still has some stitches in it, though."

"When was it he visited Skinner?"

"Two days after you were here, or thereabouts."

Ralston smiled. "He got the same medicine Skinner got. Fell into a ravine. Not a chance. I wonder what he was up to when the monkeys got him?"

"All he would tell me was that he was visiting Skinner."

"I think we'll have to pay Abbott a visit, take him our condolences."

"When do you want to go?"

"Tomorrow night, I'd say. Although maybe we ought to go now. Abbott may decide to take a trip for his health."

"If he does, Customs won't let him off Guam. We can detain him on charges of interfering with Navy operations."

"All right, tomorrow night."

Mohr had to return to Guam to file his daily report. He promised to return in the morning to provide

transportation around the island.

He had not been gone more than a few minutes when Skinner entered the meeting hall. He glared at Ralston, said, "That boy left already?"

"Which boy is that?"

"That Navy punk."

"You've a lovely tongue, Skinner. The gift of gab." Ralston noticed the envelope in Skinner's hand. "And another letter to mail," he concluded.

"Can't you answer a question?" Skinner asked furiously.

Ralston shrugged melodramatically. "If you mean Lieutenant Mohr, yes, he's left already."

Skinner limped out without another word.

Several minutes passed. Ralston finished another cup of coffee and went into the kitchen, where Malone was sorting supplies. Together they made cold sandwiches for dinner, and more coffee. They were setting one of the tables in the dining area when Stoker came in.

"Sandwiches? What's wrong with a decent meal?"

"You want it, you make it," Ralston said. "The help is through for the day."

Stoker laughed. "Easy, boy, easy. I was joking." He began piling sandwiches on a plate. "Why didn't you tell me about Skinner's bad leg?" he asked Ralston.

"Didn't I? I guess I assumed Berg would tell you."

"Berg tells me nothing."

"Well, are they going to eat?"

"I don't think so. Skinner has his own stock of food and Berg has gone to bed. A hard day." He paused, chuckling to himself. "The limp does give Skinner a certain aura of dignity, don't you think? And by the way, I'm sharing a cabin with Berg, so I guess that means you two will be cell-mates."

Stoker went to pour a cup of coffee, humming to himself. Ralston gave up eating to watch him.

"Skinner was glad to see you, was he?" Ralston asked.

"Glad? Not quite. He hates the sight of me. That's the great thing about Skinner."

"What is?"

"His temperament. He was born to needle."

"Possibly. And you've been needling him?"

"A little."

"He was just in here looking for Mohr. I think he wanted to send a letter off."

Stoker started to eat.

"You wouldn't know anything about that letter, would you?"

"No. Berg and I left Skinner's shack about twenty-five minutes ago. I suppose he wrote it after we left. Why?"

"Your needling couldn't have caused him to write it, could it? What did you say to him, if it's not too personal?"

"Not much. A few insults. Berg dragged me out before I could really get started. Blessed are the

peacemakers." Stoker went on eating.

Ralston gave it up and went back to his food. They finished the meal without much more conversation and cleaned up the kitchen.

Neither Berg nor Skinner came into the meeting hall before they left for the night.

V

Stoker awakened Ralston and Malone just after sunrise on his way to get the coffee started. He was in the kitchen trying to get breakfast organized when they got to the dining hall. Skinner and Berg were there together at a table. Berg called Ralston over to have coffee with them.

Berg had lost his excitement since Ralston had seen him last. His face was rested and serious. When he spoke he stared intently at Ralston. Skinner sipped his coffee quietly and listened to Berg.

Berg said, "Stoker has given me some idea of what you two saw yesterday. To say it's important is an understatement. But I think his interpretation of it is short-sighted. The value of these groves to the baboons is certainly not limited to a supply of roots."

"Why? It's a good hypothesis at this point. The roots were what they were interested in."

"But with so much other food available . . ."

"These roots may be in short supply, though," Ralston said. "It might be worth it to them to keep other animals away."

"Then they must have a very strong appetite for these roots, or whatever they are," Berg said.

"Why shouldn't they? Baboons grow to like things. They've been known to become alcohol and tobacco addicts. A strong taste for a specific food isn't impossible."

Berg stared at him as though he were a pupil missing the point of a lesson.

"Then again, they're energetic animals," Ralston conceded. "With no predators around, they might need something like guarding these groves as an outlet for all that energy."

Ralston expected that Berg would appreciate this point of view, and he was not disappointed. "I think that's closer to the truth," Berg agreed. "Given a lack of predators, their territorial instincts are serving as an outlet for energy. Of course, they may not merely be guarding against an invasion of their territory, but specifically against raids on these roots by the other troop. If one troop has a strong liking for them, there's no reason why the other shouldn't," Berg said, switching horses without getting his feet wet.

"I don't see why it has to be the other troop," Ralston said. "Different species often compete for the same food."

"But the division of the troop,

Ralston. Look at it in light of what you saw yesterday."

Ralston wanted to laugh. He said, "You think they split up over these roots?" He made a point of staring at Skinner as he spoke. The black eyes were cold, normal.

Berg said, "Yes, in so far as the ownership of these groves ties in with their territorial instincts. Obviously there weren't enough roots to go around. There was a squabble, and one faction threw the other out of the groves, taking control of the territory containing the groves.

"It's a perfect example of intraspecies aggression based on territoriality, and precipitated by a relatively minor issue. Aggression quite similar to that of human beings."

"That's a tidy description of World War One, but we're talking about animals with more sense than men. The fact that one troop likes these roots well enough to guard them doesn't say a thing about intraspecies aggression or territoriality. It says they like the roots."

Berg was patient. He took one of the mimeographed maps of the island out of a shirt pocket. "This is my map of the northern troop's movements yesterday. I've copied the data from Stoker's map onto it."

Ralston could see the trail of the southern troop running east from the center of the island to the edge of the jungle.

"Now the groves you saw, being almost exactly on an east-west line, could easily lie on the territorial boundary. Notice the position of the northern troop. At times they were no more than a half-mile from this line. If the groves are not exactly on the boundary, they are not far from it."

"All right, baboons are territorial animals. I'm not arguing the point. You have two troops, you have two territories. It's among the things that make them attractive subjects for experiments like this. And the border is probably somewhere near where you say it is. But there's no proof those groves are tied in with questions of territoriality. Territories were probably established without anyone worrying about where those groves ended up."

"But there are baboons *stationed* along a line quite near the border, Ralston," Berg said.

"A monkey Maginot Line, since we were talking about world wars?"

"Essentially, yes. And because the southern troop was moving east when we first saw them, it implies that more groves exist farther west in the savanna. There could, in fact, be a line of them across the island."

"But when we saw them last they were heading south," Ralston argued. "Why guard more groves down there if they're guarding against the troop in the north?"

"There may not be any down there. It was late in the afternoon.

They were probably making for some sleeping places." Berg looked pleased with his explanation.

"Maybe. Did Stoker tell you about the trail they've worn in the grass?"

"Yes," Berg said.

"If we follow that trail west, we'll know whether any more groves exist."

"Exactly. We're going to do that this morning, by helicopter. Then you and I will observe the southern troop while Stoker and Malone take the other."

The change in teams told Ralston he was in for a day of argument. Did Berg think he was being hard to convince for the hell of it, or had Stoker really shot his mouth off to Berg and Skinner last night, and made him seem like the complete heretic?

As Ralston got up and started for the kitchen, Skinner spoke for the first time. "I understand you're going to prove I'm some kind of bad influence around here?"

Ralston looked at Berg, who was staring into his coffee cup. Ralston said, "Unless the baboons are gullible enough, you're no influence at all, Skinner." Stoker and his mouth.

It surprised Ralston when Skinner laughed.

Breakfast was eaten with limited conversation. When Mohr arrived, they became more sociable, including Skinner. He joked with Mohr before Berg became serious and outlined the day's plans for the lieutenant.

When Berg finished, Mohr said, "Do you think I could come along with you and Dr. Ralston?"

Berg was surprised by the request, and a little wary of it. "To observe on foot?"

"Yes."

"It's uncomfortable work."

"I'm prepared for that."

"Well, if you want to, I can't stop you, can I?"

The pilot found the two groves without trouble. From the western one they followed the trail into the savanna. It could be seen easily from the air. It ran straight west, as straight as it had seemed to Ralston from the ground.

The trail covered two miles to the western jungle. They searched those two miles carefully, but there were no more groves, no more baboons. Only a scattering of trees and bushes broke the grass, and few of those were anywhere near the trail.

"Last night you were saying there were more guards along this trail," Stoker said to Berg. "What do you say now?"

Berg was upset by what they had not found, but he said, "With no trees of any size out here for shelter, obviously there could be no permanent guards. But the trail is well used. The troop itself must patrol this segment of the border. The job would be that much easier be-

cause the two groves protect the east."

"It's also possible they have another use for this trail," Stoker said. "I think we ought to follow it into the jungle."

Berg was not enthusiastic about the suggestion, but he asked the pilot to land.

The trail did not go far into the jungle. The party had just entered the first thick growth when the trail ended at the edge of a stream.

"This must be the troop's regular water supply," Ralston said.

"Perhaps," Berg said. "But there must be streams in the eastern jungle too. Why come all the way over here?"

"If they visit those groves frequently enough," Stoker said, "it seems they'd use the water supply nearest to them. This may be it."

Berg became irritated. "The trail could be used just as easily to patrol the border."

"They might use it to chase butterflies, too, if butterflies flew in straight lines," Stoker said.

"Baboons usually defend their territories on the run," Ralston said. "What you're suggesting about the trail as border defense is nothing new. The groves and the waterhole lie near the border, but they don't have to have anything to do with the border."

"I suppose there's no use arguing here," Berg said. "We may be able to throw some light on the problem today."

When Ralston, Berg, and Mohr were dropped off at the western grove, Berg had little to say other than to suggest that Ralston keep the day's log of observations. Either the presence of Mohr or the morning's disappointments had stifled the lecture Ralston had expected.

The morning went by quietly. It was after ten before one of the adults guarding the grove climbed out of the tree he had been sleeping in and began chewing at handfuls of grass and leaves. He dug around and came up with something resembling a brown rock. He ate it slowly.

The other adult and the adolescent soon joined him in breakfast. After the meal they settled into a routine of strolling around the grove, squatting down to dig at the ground, chewing at plants, or napping. It was past noon when the routine was disturbed by the troop arriving from the east.

"All right, let's each of us watch one of the guards," Berg said. "I want to know if the same animals are left behind, or if they are replaced." He assigned them each a guard and they watched diligently. When the troop headed out to the west, the three males they were watching went with it. In their places were two other adults and one other adolescent.

It was not much of a surprise; no one said anything. The troop was out of sight quickly. They went back to watching the grove.

The new guards spent some time digging for roots and looking under rocks for insects. Eventually they sat down together and kept an eye on things.

East of the grove were several clumps of brush. These harbored native pigs. At the edge of one clump a pig lay hidden, watching the monkeys grow bored with their duties. When the baboons began to doze, the pig decided to sneak across the grass toward the grove.

The monkeys were not as lethargic as they seemed. The first growling screech out of them woke the entire neighborhood. The human observers, who had been half-dozing themselves, were as startled as the pig.

"Whatsat?" Mohr asked.

"A pig," Ralston said. "The monkeys just saw him."

"A pig?" Berg asked.

"I'm afraid so."

The pig made a show of ferocity. He charged toward the grove, but the monkeys stood shoulder to shoulder barking and screeching, and the pig pulled up short of them by several yards. The baboons hunched down on their front legs and made lunging motions at the pig. They bared their teeth, and their manes came up straight in a horrific display. It was a moderate statement of displeasure, not an invitation to mayhem, and the pig seemed to realize this. He snorted and grunted, but came no closer. The monkeys were showing him the door, as politely as baboons can, and he took the hint. To the tune of more barks and screeches, the pig backed away and was gone into the brush.

"And what animal normally thrives on roots?" Ralston asked of the air. "There must be some very unhappy pigs on this island."

"That's what all the guarding is about?" Mohr asked.

"It's a good bet right now."

Berg said, "You don't think much of my ideas, do you, Ralston?" He was bitter, and he was outraged that Ralston should disagree with him so casually in front of an outsider.

Mohr pretended to be watching the place where the pig had vanished, embarrassed to know exactly what Ralston thought of Berg's ideas.

"We haven't seen the other troop come near this grove, but we have seen a pig try to sneak in. All I said was, it's a good guess right now."

"You enjoy putting me in a bad light, just as Stoker does. And what do you two have against Skinner?"

"Is that what Stoker crowed to you about last night?"

"You didn't answer me."

"I have nothing against you, but I think Skinner is trying to ruin this experiment. I've told you that before. I think I'll be able to prove it soon."

"You'd better be able to." Berg

walked away from them to stare at the monkeys. Ralston had to look at them too, and found them staring back, wondering at the commotion.

"What do you think of him now?" Mohr asked.

"I think I'd better be right about Abbott, that's all."

"Don't let that worry you. Abbott's in on it."

"What?"

"I would have told you earlier, but people were around," Mohr said. "I've had a man checking into details on that second shipment of baboons. When I got back to Guam last night, he had a copy of the original shipping order that came with them. It was made out to Abbott, and he signed a receipt for them when they arrived on Guam."

"Why Abbott and not Skinner?" Ralston asked.

"Easy. Skinner's only contact with Guam is through the Navy. Thick as we are, we might have wondered a little about another shipment of baboons arriving at the base addressed to Skinner. We would have remembered it, anyway."

"I think I'm looking forward to seeing Abbott."

Some time after the pig was routed, Chester came limping along the trail from the east. The three guards greeted him happily, and one offered him a fresh root.

Berg watched Chester with uneasy interest. It was plain to Ralston that he did not like reminders of Skinner's handiwork, but Chester could not be ignored.

Ralston dug out some fruit and dog candy. "Come on, I'll introduce you to Chester," he said to Mohr.

They approached the guards cautiously. Once the three saw the food they became quite friendly. Chester hesitated, but soon came up with the guards.

"I didn't realize they were this friendly," Mohr said.

"They're not. They're greedy. Any food is good, but food they don't have to hunt for is twice as good."

The treats finally ran out and Ralston and Mohr retired to wait for the troop's return from the water hole.

It was past three when the monkeys came through the grove. This time they did not change guards, but the males went through the fraternal rites Ralston and Stoker had witnessed the day before. Chester went with the troop when it left.

The helicopter picked them up at four o'clock. Ralston suggested they trace the baboon trail south from the eastern grove. Berg was indifferent to the idea, but Ralston insisted they go ahead with it.

They overtook the troop leaving the eastern grove. From there the trail covered four miles going south. It stuck to the edge of the

jungle. Following it, they found three more guarded groves. Between the southernmost grove, where the trail ended, and the one immediately north of it, was a long face of bare rock.

"They probably spend their nights there," Ralston said, pointing the face out to Mohr as he marked it on his map. Berg had few comments on their latest finds as they flew to pick up Stoker and Malone.

Stoker and Ralston compared notes on the way back to the cabins. Berg showed no interest in Stoker's report until they had landed and were seated in the meeting hall. Stoker pointed out the northern troop's movements on his map. It had been foraging farther south than the day before. At times it had been within shouting distance of the southern troop before it had turned back for the night.

"Since they're moving south," Berg said, "it's possible they'll reach the trail and the groves tomorrow. What they do then will be invaluable to us. What both troops do, I should say."

"You still think they're the root bandits, after what Ralston's been telling me about that pig?" Stoker asked.

"The guards may be there to keep pigs out as well as the other troop," Berg said.

"I don't think so," Stoker said. "If there are five groves worth guarding in the southern part of the island, there must be more in the north. Why risk territorial squabbles over someone else's roots?"

"As you said about water this morning, Stoker, we can't be positive about how the island's resources are distributed. Besides, baboons are born thieves," Berg said.

"I'll be surprised—no, astounded—if the northern troop tries to get at those groves tomorrow, or any other time," Stoker answered.

The argument tapered off. Ralston suggested they make dinner. Berg left, saying he had no appetite.

"Off to report to Skinner," Stoker said.

After dinner, Ralston told Stoker he had business on Guam.

"Oh? Something urgent?"

"It might be. I was going to tell Berg, but it would only start an argument now. I may be back tonight."

"We won't wait up for you."

The helicopter followed a radar signal across the dark ocean. Ralston and Mohr had the cargo section to themselves.

"I've got another letter to mail from Skinner to Abbott," Mohr said.

"Probably telling him to clear out. Stoker's been running off at the mouth."

"Where does Abbott come into what Skinner's been doing?"

"At the beginning, I think."

Before taking off, Ralston had

gone back to his cabin for a book. He took it out of his jacket pocket now and handed it to Mohr. It was a thin, maroon book, and when Mohr turned its spine to the weak overhead bulbs, small gold letters read, "The Piltdown Forgery," and below that, "Weiner."

"Piltdown? As in Piltdown Man?" Mohr asked.

"As in that big skull Abbott has displayed behind his cash register. I could only read part of the name on it, and it bothered me because what I read almost rang a bell: *Eoanthropus.* When I tried to look it up, I couldn't find it in the standard references.

"I asked myself why they wouldn't list it, and the only answer seemed to be that the animal wasn't recognized by science, and that told me what it was, a fake. The full name is *Eoanthropus dawsoni.* Freely translated, that means something like 'Dawson's Dawn Man', Dawson being the man who found it. Its popular name is Piltdown Man.

"That book has a description of a shop a lot like the Albion Gift Shop. It's on pages 98 and 99."

Mohr held the book up to the light and read. After a few pages he looked at Ralston and said, "This shop in here was owned by an Abbott too?"

"Lewis Abbott, an amateur geologist early in the century. When Piltdown was discovered around 1909, Abbott was an associate of Dawson. In fact, it was Abbott who suggested that Dawson dig where Piltdown was found.

"Weiner portrays Abbott as an eccentric, a man who took his science flamboyantly. He was among the earliest apologists for Piltdown."

Ralston paused, remembering the skull in Samuel Abbott's shop. "There were two 'specimens' of Piltdown found. They're both fakes. But who did these fakes—and they were done so skillfully that it took forty years to expose them—is still unknown.

"But Piltdown was attacked many years before it was proved a fraud. And, in the early days of its discovery, an interesting process took place. Every time a critic found something wrong with Piltdown, another bit of fossil would be 'discovered' which would silence the criticism. If it was objected that the jaw lacked a canine tooth, and that without one nothing could be said for sure about the jaw's ancestry, a canine tooth popped up almost immediately."

"You're kidding."

"No. Weiner's recorded it all. And it may be that the skull we saw in the Albion was prepared to silence other criticism, and was to be 'found' at the proper time. But the proper time never came. There were other, legitimate, discoveries being made which put Piltdown in an awkward position. Dart found his first Australopithecine around

1924, and it raised questions about Piltdown's place in evolution.

"It may be that the hoaxer saw that Piltdown was doomed and gave it up. Lewis Abbott died in 1933. If he was the hoaxer, he may have revealed the hoax to someone close to him before he died, his son or grandson, maybe. Samuel Abbott says his grandfather started the collection of bones he has. He's in late middle age, born maybe around 1910. He could easily be Lewis Abbott's grandson.

"If there was another skull, Lewis Abbott may have told his heirs to keep it under wraps, hopefully until some quirk of scientific discovery would make it possible to resurrect Piltdown. That is, if the heirs were inclined to scientific hoaxes, which I'm guessing they were.

"Of course, Piltdown's time never came again. It was suspect a long time, but Oakley proved it was a fake in 1953. The jaw fragments and the cranium fragments weren't from the same animal, although they had been stained to look like they were.

"Samuel Abbott couldn't have been too happy about it, if he really was planning to keep up the hoax. He *might* have been unhappy enough to devise some other hoax, one not so easily detected. A hoax like the one Skinner's been cooking up, maybe."

Mohr shook his head. "That's quite a theory. I suppose hoaxes could run in a family, but—didn't Samuel Abbott wait a long time to take up where Piltdown left off?"

"Maybe. But who's to say that this is his first try at a hoax since Piltdown was discredited?"

"Not me."

"Of course, my theory is mostly guesswork. I'm not even sure that Lewis Abbott ever got married or had any children, let alone grandchildren. But, as a theory, it gives us a motive for what Skinner's been doing, unless Berg really is botching up his own experiment."

"And you think we can get Abbott to confirm your guesses?"

"We can try."

After they landed, Mohr went to check in at his office. The building was a converted barracks, quiet and empty, with only hall lights on. Mohr switched on the lights in one small compartment, and picked up the day's collection of papers on his desk.

One sheet caught his eye. He put the rest down and turned to Ralston. "Do you know who ordered the second troop of baboons from the supplier?"

"Not Abbott?"

"No." Mohr handed the paper to Ralston. "Dr. Stoker sure didn't tell you the whole story about that. Here's a photostat of the order. It came in this afternoon."

Ralston took the slick paper covered with brown-black ink. It was a standard order form, and the signa-

ture at the bottom was "Jacob Lang Wilson, Ph.D."

"Another J. L. Wilson," Ralston said.

"The real one?"

"It must be. It explains how those animals got ordered. The suppliers only sell to accredited workers, and Wilson is still a Doctor of Psychology. I wish I'd thought of that before."

"Then Wilson is responsible for Skinner?"

"No, I think Wilson *is* Skinner. It explains the closeness between Berg and Skinner."

"Maybe. What do we do now, just go up to Skinner and ask him who he is?"

"We could. Or we could ask Stoker—or Abbott."

Abbott's shop was closed, but there were lights in the rear of the building. Ralston knocked several times before Abbott, leaning on a cane, came to the door.

"What is it?" he asked, not recognizing them.

"My name's Ralston. I'm a member of that project you and Skinner have been fooling with. And you may remember Lieutenant Mohr from your stay in the hospital."

"Yes. And you were in my shop with him last week, weren't you? You're no longer a drama teacher?"

"It was fun while it lasted. Can we come in?"

Abbott stared at him, looked past him at Mohr, and stood back to let them pass. He turned on the shop lights, and Ralston said, "You do know Skinner, don't you?"

"I'm a friend of his, yes."

"Just a friend? What was in that frantic note he sent you last week?" Ralston asked.

"Frantic note? You're melodramatic. Skinner gets lonely and I visit him occasionally."

"To help him cook up new tricks to play on the monkeys?"

"You're talking in riddles."

"All right, riddle me this: are you related to Lewis Abbott, the man who was involved in the discovery of that 'human ancestor' you've got hanging on the wall?" Ralston motioned toward the specimen of Piltdown.

"Lewis Abbott was my grandfather."

"And you got that skull from him?" Ralston asked.

"Yes, I did."

"And you go around showing it off?"

Abbott was puzzled. "Of course, why not? Oh, you think it's a real fossil, don't you? I'm afraid not. It's plaster. None of the actual skulls were that complete. My grandfather made that cast, and tried to fill in some of the missing parts. But I've never pretended it was real. If you'd asked me when you were in here before, I'd have told you it was plaster."

Ralston looked at the skull. The perverse union of human cranium

and ape jaw hardly resembled plaster. "Somebody did an awful lot of work staining that thing, if it's plaster."

"So?"

"Could I have a closer look at it?"

"No. It's quite old. I don't allow it to be handled."

"All right, it's plaster. The originals were fakes too, so I guess it hardly matters."

"It's been claimed they are fakes."

"Claimed? Oakley proved it."

"Perhaps. You think my grandfather was involved in this so-called faking of Piltdown?"

"It's occurred to me."

"And you came here simply to malign my grandfather?"

"No. Like I said, there's been some tampering done to our project. Some animals were shot, and some others were smuggled in to take their places."

"And you think I'm a smuggler?"

"I think you're a man who likes hoaxes."

"Because you think my grandfather did?"

"Partly. And because of a group of baboons you accepted from a shipper for Skinner, because they couldn't be sent through the Navy base. You do remember them?"

"Yes. I did it as a favor to Skinner, that's all there was to the matter."

"And you went over to the island last week and got your leg chewed up by a monkey as a favor to him too?"

"I fell."

Mohr said, "The doctor who stitched you up said your wounds were made by an animal."

"Doctors can be wrong."

"Then maybe we're wrong, too," Ralston said. "Maybe we have things backwards. Skinner doesn't strike me as a man with the wits to plan a hoax, or the money to carry it out. Maybe he's been doing favors for you, instead of the other way around. How's that sound?"

Abbott laughed. "He hasn't the wits? That makes me guilty by process of elimination? Let me tell you something, you two aren't as clever as you think you are."

"How's that?" Mohr asked.

"You've missed one very important fact about Skinner. You don't really know who he is. If you did, you wouldn't come ragging me about this."

"We know he's J. L. Wilson. That's no great secret," Mohr said flatly. "Don't tell me he's also Judge Crater?"

Abbott glared at them. "Well? What do you want from me, then?"

"We were just wondering if Wilson would go along with your version of the hoax," Mohr said.

Angrily, Abbott said, "Lieutenant, Wilson and I have been friends a long time. I met him before he fell out of academic favor. Shortly before this project got under way he came to me with his

plans for, ah, embellishing it. I thought they were good plans. You see, I have always agreed with his ideas. I felt the scientific community had done him an injustice, and I did not like to see his ideas die."

Abbott glanced around the shop. "I came out here to see his results, and of course I had to bring my things with me. I did nothing improper, unless encouraging a man to stick to his beliefs is wrong."

Mohr said, "That's nice talk. But we can bring charges against Wilson, and anyone helping him, for interfering with Navy operations. There's also a charge of mistreating a protected species floating around looking for someone to land on.

"So let's try another version of things: I think when you heard that Dr. Berg was running this project, you put Wilson up to tampering with it, hoping he could get a job on it through his friendship with Dr. Berg. You knew Wilson was embittered enough to go along with a hoax, especially one that supported his theories."

"That's a lovely fiction," Abbott said.

"Is it? It's good enough to give you plenty of trouble. Why did you go out to the island last week?"

"I told you, to visit Wilson."

"No, there was more to it than that. I think he needed something done, something he couldn't do with a bad leg. What was it?"

Abbott said nothing. Mohr went on, "As far as I can see, you and Wilson are equally responsible for this hoax. But it doesn't matter to me if only one of you gets the blame, as long as the Navy is cleared."

"You're a wolfish young man," Abbott said.

"Sure. Think it over. What were you doing out there?"

Abbott shrugged. "You know that Wilson killed some monkeys. Well, he made a mess of it. He wounded one and it got away. He tried to get close enough to the troop to finish it off, but two others he didn't want to kill protected it. When he kept after them, they turned on him. He was lucky to beat them off with his rifle.

"He hoped it had died, but when he heard last week that it was still alive, and that Berg was coming out, he had to have it killed. He asked me to kill it.

"I tried, in a half-hearted way. I'm no hunter. The monkey hunted me. You saw what he did to my leg. I never had a chance to shoot.

"So you see, I've really done no harm to your project. Does that satisfy you, Lieutenant?"

"For now. Someone from our legal office will be here in the morning to take a statement of what you've just told us. I'd advise you to give him one, and then sign it."

"My earlier estimate of you was too mild, Lieutenant."

"Sure. Good night."

Outside, Ralston said, "You're really going to prosecute Wilson?

That protected species charge was a fake, you know."

"Abbott wouldn't know that, or at least I hoped he wouldn't. But I don't think we'll bother either of them any more. With Abbott's statement I can put Isaacs' complaint back through channels so fast it'll burn his fingers when it gets to him."

Driving back through Agaña, Mohr mailed Wilson's letter to Abbott.

Ralston spent the night in a Navy barracks. He put himself to sleep imagining what he would say to Berg in the morning.

VI

Stoker and Berg were waiting for the helicopter. The morning was early enough to be cool. Ralston felt in command of things when he and Mohr emerged from the copter.

Stoker was smiling. He said, "The jig is up, Ralston."

"Shut up, Stoker," Berg said.

"You mean Wilson's jig?" Ralston asked.

Stoker laughed. Berg said, "Wilson?"

"Wilson, Skinner, whichever you like," Ralston said. "I mean the small fact that made Stoker suspicious enough to watch shipments of monkeys. You could have told me, one of you."

Stoker's face was innocent. "In the interests of rehabilitation, I promised Berg I'd never let the dark secret out. How'd you find it out?"

"In a minute. What about jigs being up?"

Stoker said, "Wilson has taken flight to avoid whatever he has on his conscience. Like killing monkeys and doctoring experiments."

"You're lying again, Stoker," Berg said.

"What do you call it, a midnight tryst with a lady baboon?"

"What's Wilson done?" Ralston asked.

Berg said, "Following some harassment by Stoker last night, Wilson left his cabin and hasn't been back. He apparently took a rifle with him."

"Helpful, aren't you?" Ralston asked Stoker.

"I plead no contest. The bastard was too smug yesterday. I couldn't resist shaking him up.

"I guess you put a scare into him when you came out here, and he was afraid Berg would take you seriously about shooting those monkeys. But Berg wore his blinders out here. He was calming Wilson's nerves that first night when I went in and stirred things up. I told both of them you were on to Wilson, but later Berg went back and convinced the old fraud that you and I couldn't prove there were twelve inches in a foot, let alone that Wilson was up to anything unethical.

"That made Wilson too smug to stand. He was even making jokes

yesterday. So after you left I told them what I knew about the second troop, and that you'd gone to Guam to get the evidence. It was a fine performance, one of my best. I'll cherish the look on Wilson's face forever."

"Damn it, haven't you lied enough, Stoker?" Berg said. "And if you've been taken in by Stoker's delusions, Ralston, I hope you're satisfied with the outcome. Wilson is in no condition to be tramping around all night."

Ralston had with him the copies of the shipping documents and the order forms that Mohr had collected. He handed them to Berg. "Stoker may have delusions, but not in this case. Here are the records of what Wilson did."

Berg looked at the papers. He inspected every word, went over everything twice. "You're certain these haven't been falsified?"

"Yes," Mohr said.

"Then who is this Abbott?"

Ralston explained what they had learned from and about Abbott.

"Then Wilson really wasn't—"

Ralston interrupted him. "Wilson and Abbott were both tampering with the project. It would be hard to say who suggested what to whom, but Wilson did most of the actual damage."

Berg stared at the papers. Ralston thought he had accepted them.

"It's the truth," Ralston said.

Berg said, "This just about destroys the project, doesn't it?"

"I hope not. There's a lot to be saved, if we're honest about the tampering. I think Stoker agrees with me."

"Sure," Stoker said. "Even Wilson couldn't cook up a fraudulent guard system. Not in just five years, anyway."

Berg was not listening. He said, "A second troop. It's bad enough that the original one didn't split, but . . . do you know what's worse?"

"What?" Ralston asked.

"My monkeys should have run that second troop off the island. They shouldn't have given them an inch of it, but they gave them all they wanted."

"I suppose they didn't need all of it," Ralston said.

"But it was theirs and they gave it up!"

No one had anything to say to that. Berg handed the papers back to Ralston. "I think I see why Wilson shot those monkeys. He put that second troop on the island just to see if the first would fight. When they gave them room instead . . . well, if I saw them again, I might start shooting too."

Stoker gave him a look of exaggerated disbelief. Berg said to him, "I think it's the truth. There was no hoax intended."

Stoker said, laughing, "You silly son of a bitch. Did you expect that charlatan to turn honest out here?"

"Does it matter? Partly through

your meddling, the project is dead. Unless Ralston really thinks he can keep it going." Berg turned to Mohr. "Don't you think you ought to find Wilson?"

"Certainly. I can start right now. Is anyone going out to watch the monkeys?"

"I don't know," Berg said. He walked away.

Mohr looked at Ralston and Stoker. Stoker said, "So, here we are; all ours, lock, stock, and quicksand. *Is* anyone going out to watch the monkeys? Besides me, I mean?"

"Yes, but let's find Wilson first," Ralston said.

It was a brief search. They found him lying in the middle of the trail the southern troop had worn in the savanna. He faced east, the rifle between his legs. He ignored the helicopter as it landed.

He had been resting a short time. His face was pale, his arms trembling. His bad leg was too swollen to stand on. Breathing raggedly, he did not try to speak as they carried him into the copter.

He slumped against the wall as

they flew back to the cabins. His eyes stayed closed. He was simply an old man whose anger had nearly killed him. Even Stoker left him to his thoughts.

VII

The island's other cripple spent the night serenely. Chester slept with the guards in the eastern grove. The helicopter woke him, and he watched as two men got out of it. They came near the grove and sat down among some bushes. The thought of candy appealed to Chester, but the men came no nearer, and he forgot it.

The troop came through the grove and Chester went with it when it left. The troop was approaching the western grove—with Chester well behind—when the northern troop came into sight. Leroy called a halt. He and Muggs and Hamlet went out to watch their neighbors. Relations with the northern troop had been limited since the territorial settlement. Did their presence mean that they had managed to forget the terms of that settlement? If so, Leroy planned to remind them where their rights ended.

Chester had almost caught up with the troop before he noticed the reason for stopping. He looked casually at the northern troop, then looked again. Off to one side stood the leaders; the four-man elite was watching Chester.

The northerners came no closer to the border. Leroy considered hurling a few insults across at them, but he settled for a long glare at their leaders. Confident they had the message, he hurried his troop along.

Chester stood quietly and watched them leave. He looked again at the northern elite. Glancing around, he saw the two men following him and the thought of candy crossed his mind again. But the men stopped and stared back at him, and Chester's attention returned to the other side of the border.

The northern leader approached the border. He stared at Chester curiously. He, like Leroy, had not gained his position with a shortage of wits. He sensed the novelty of Chester; his look invited Chester over for a closer inspection.

For his part, Chester did not miss the promise in the leader's interest. A baboon has never been known to change troops, but in Chester that imperative wrestled with another desire, one most basic in primates. It was the yearning for the company of fellows, the need not of a merely gregarious animal, but of a truly social one.

Chester looked once more at the southern troop disappearing on its route, and then limped across the border to be received with enthusiasm by the leader. The troop moved away north at a cripple's pace. ■

NOTEBOOKS OF LAZARUS LONG

Robert A. Heinlein

In the July 1941 issue of Astounding Science Fiction, Robert A. Heinlein's novel, "Methuselah's Children," introduced the virtually immortal Lazarus Long. The following excerpts from the Notebooks of Lazarus Long are part of Heinlein's new novel, "Time Enough for Love: The Lives of Lazarus Long." The Notebooks represent the wit and wisdom of a man who has lived for centuries—and enjoyed every minute of it!

■ Always store beer in a dark place.

■ By the data to date, there is only one animal in the galaxy dangerous to man—man himself. So he must supply his own indispensable competition. He has no enemy to help him.

■ Men are more sentimental than women. It blurs their thinking.

■ Certainly the game is rigged. Don't let that stop you; if you don't bet, you can't win.

■ Any priest or shaman must be presumed guilty until proved innocent.

■ Always listen to experts. They'll tell you what can't be done, and why. Then do it.

■ Get a shot off *fast.* This upsets him long enough to let you make your second shot perfect.

■ There is no conclusive evidence of life after death. But there is no evidence of any sort against it. Soon enough you will *know.* So why fret about it?

■ If it can't be expressed in figures, it is not science; it is opinion.

■ It has long been known that one horse can run faster than another—but *which one?* Differences are crucial.

■ A fake fortune-teller can be tolerated. But an authentic soothsayer should be shot on sight. Cassandra did not get half the kicking around she deserved.

■ Delusions are often functional. A mother's opinions about her children's beauty, intelligence, goodness, et cetera ad nauseam, keep her from drowning them at birth.

■ Most "scientists" are bottle washers and button sorters.

■ A "pacifist male" is a contradiction in terms. Most self-described "pacifists" are not pacific; they simply assume false colors. When the wind changes, they hoist the Jolly Roger.

■ Nursing does not diminish the beauty of a woman's breasts; it enhances their charm by making them look lived in and happy.

■ A generation which ignores history has no past—and no future.

■ A poet who reads his verse in public may have other nasty habits.

■ What a wonderful world it is that has girls in it!

■ Small change can often be found under seat cushions.

■ History does not record anywhere at any time a religion that has any rational basis. Religion is a crutch for people not strong enough to stand up to the unknown without help. But, like dandruff, most people do have a religion and spend time and money on it and seem to derive considerable pleasure from fiddling with it.

■ It's amazing how much "mature wisdom" resembles being too tired.

■ If you don't like yourself, you *can't* like other people.

■ Your enemy is never a villain in his own eyes. Keep this in mind; it may offer a way to make him your friend. If not, you can kill him without hate—and quickly.

■ A motion to adjourn is always in order.

■ No state has an inherent right to survive through conscript troops and, in the long run, no state ever has. Roman matrons used to say to their sons: "Come back with your shield, or on it." Later on, this custom declined. So did Rome.

■ Of all the strange "crimes" that human beings have legislated out of nothing, "blasphemy" is the most amazing—with "obscenity" and "indecent exposure" fighting it out for second and third place.

■ Cheops' Law: Nothing *ever* gets built on schedule or within budget.

■ It is better to copulate than never.

■ All societies are based on rules to protect pregnant women and young children. All else is surplusage, excrescence, adornment, luxury, or folly which can—and

must—be dumped in an emergency to preserve this prime function. As racial survival is the *only* universal morality, no other basic is possible. Attempts to formulate a "perfect society" on any foundation other than "Women and children first!" is not only witless, it is automatically genocidal. Nevertheless, starry-eyed idealists (all of them male) have tried endlessly—and no doubt will keep on trying.

■ All men are created unequal.

■ Money is a powerful aphrodisiac. But flowers work almost as well.

■ A brute kills for pleasure. A fool kills from hate.

■ There is only one way to console a widow. But remember the risk.

■ When the need arises—and it does—you must be able to shoot your own dog. Don't farm it out—that doesn't make it nicer, it makes it worse.

■ Everything in excess! To enjoy the flavor of life, take big bites. Moderation is for monks.

■ It may be better to be a live jackal than a dead lion but it is better still to be a live lion. And usually easier.

■ One man's theology is another man's belly laugh.

■ Sex should be friendly. Otherwise stick to mechanical toys; it's more sanitary.

■ Men rarely (if ever) manage to dream up a god superior to themselves. Most gods have the manners and morals of a spoiled child.

■ Never appeal to a man's "better nature." He may not have one. Invoking his self-interest gives you more leverage.

■ Little girls, like butterflies, need no excuse.

■ You can have peace. Or you can have freedom. Don't ever count on having both at once.

■ Avoid making irrevocable decisions while tired or hungry. N.B.: Circumstances can force your hand. So think ahead!

■ Place your clothes and weapons where you can find them in the dark.

■ An elephant: A mouse built to government specifications.

■ Throughout history, poverty is the normal condition of man. Advances which permit this norm to be exceeded—here and there, now and then—are the work of an extremely small minority, frequently despised, often condemned, and almost always opposed by all right-thinking people. Whenever this tiny minority is kept from creating, or (as sometimes happens) is driven out of a society, the people then slip back into abject poverty.

This is known as "bad luck."

■ In a mature society, "civil servant" is semantically equal to "civil *master.*"

■ When a place gets crowded enough to require ID's, social collapse is not far away. It is time to go elsewhere. The best thing about space travel is that it made it possible to go elsewhere.

■ A woman is not property, and husbands who think otherwise are living in a dream world.

■ The second best thing about space travel is that the distances involved make war very difficult, usually impractical, and almost always unnecessary. This is probably a loss for most people, since war is our race's most popular diversion, one which gives purpose and color to dull and stupid lives. But it is a great boon to the intelligent man who fights only when he must—never for sport.

■ A zygote is a gamete's way of producing more gametes. This may be the purpose of the universe.

■ There are hidden contradictions in the minds of people who "love Nature" while deploring the "artificialities" with which "Man has spoiled 'Nature.' " The obvious contradiction lies in their choice of words, which imply that Man and his artifacts are *not* part of "Nature"—but beavers and their dams *are.* But the contradictions go deeper than this *prima facie* absurdity. In declaring his love for a beaver dam (erected by beavers for beavers' purposes) and his hatred for dams erected by men (for the purposes of men) the "Naturist" reveals his hatred for his own race—that is, his own self-hatred.

In the case of "Naturists" such self-hatred is understandable; they are such a sorry lot. But hatred is too strong an emotion to feel toward them; pity and contempt are the most they rate.

As for me, willy-nilly I am a man, not a beaver, and H. Sapiens is the only race I have or can have. Fortunately for me, I *like* being part of a race made up of men and women—it strikes me as a fine arrangement and perfectly "natural."

Believe it or not, there were "Naturists" who opposed the first flight to old Earth's Moon as being "unnatural" and a "despoiling of Nature."

■ "No man is an island—" Much as we may feel and act as individuals, our race is a single organism, always growing and branching—which must be pruned regularly to be healthy. This necessity need not be argued; anyone with eyes can see that any organism which grows without limit always dies in its own poisons. The only rational question is whether pruning is best done before or after birth.

Being an incurable sentimentalist I favor the former of these methods—killing makes me queasy, even when it's a case of "He's dead and I'm alive and that's the way I wanted it to be."

But this may be a matter of taste. Some shamans think that it is better to be killed in a war, or to die in childbirth, or to starve in misery, than never to have lived at all. They may be right.

But I don't have to like it—and I don't.

■ Democracy is based on the assumption that a million men are wiser than one man. How's that again? I missed something.

■ Autocracy is based on the assumption that one man is wiser than a million men. Let's play that over again, too. Who decides?

■ Any government will work if authority and responsibility are equal and coordinate. This does not insure "good" government; it simply insures that it will work. But such governments are rare—most people want to run things but want no part of the blame. This used to be called the "back-seat driver syndrome."

■ What are the facts? Again and again and again—what are the *facts?* Shun wishful thinking, ignore divine revelation, forget what "the stars foretell," avoid opinion, care not what the neighbors think, never mind the

unguessable "verdict of history"—what are the facts, and to how many decimal places? You pilot always into an unknown future; facts are your single clue. Get the facts!

■ Stupidity cannot be cured with money, nor through education, nor by legislation. Stupidity is not a sin, the victim can't help being stupid. But stupidity is the only universal capital crime; the sentence is death, there is no appeal, and execution is carried out automatically and without pity.

■ God is omnipotent, omniscient, and omnibenevolent—it says so right here on the label. If you have a mind capable of believing all three of these Divine attributes simultaneously, I have a wonderful bargain for you. No checks, please. Cash and in small bills.

■ Courage is the complement of fear. A man who is fearless cannot be courageous. (He is also a fool.)

■ The two highest achievements of the human mind are the twin concepts of "loyalty" and "duty." Whenever these twin concepts fall into disrepute—get out of there fast! You may possibly save yourself but it is too late to save that society. It is doomed.

■ People who go broke in a big way never miss any meals. It is the poor jerk who is shy a half slug who must tighten his belt.

■ The truth of a proposition has nothing to do with its credibility. And vice versa.

■ Anyone who cannot cope with mathematics is not fully human. At best he is a tolerable subhuman who has learned to wear shoes, bathe, and not make messes in the house.

■ Moving parts in rubbing contact require lubrication to avoid excessive wear. Honorifics and formal politeness provide lubrication where people rub together. Often the very young, the untraveled, the naïve, the unsophisticated, deplore these formalities as "empty," "meaningless," or "dishonest," and scorn to use them. No matter how "pure" their motives, they thereby throw sand into machinery that does not work too well at best.

■ A human being should be able to change a diaper, plan an invasion, butcher a hog, conn a ship, design a building, write a sonnet, balance accounts, build a wall, set a bone, comfort the dying, take orders, give orders, cooperate, act alone, solve equations, analyze a new problem, pitch manure, program a computer, cook a tasty meal, fight efficiently, die gallantly. Specialization is for insects.

■ The more you love, the more you *can* love—and the more intensely you love. Nor is there any limit on how *many* you can love. If a person had time enough, he could love all of that majority who are decent and just.

■ Masturbation is cheap, clean, convenient, and free of any possibility of wrongdoing—and you don't have to go home in the cold. But it's *lonely.*

■ Beware of altruism. It is based on self-deception, the root of all evil.

■ If tempted by something that feels "altruistic," examine your motives and root out that self-deception. Then, if you still want to do it—wallow in it!

■ The most preposterous notion that H. Sapiens has ever dreamed up is that the Lord God of Creation, Shaper and Ruler of all the Universes, wants the sac-

charine adoration of His creatures, can be swayed by their prayers, and becomes petulant if He does not receive this flattery. Yet this absurd fantasy, without a shred of evidence to bolster it, pays all the expenses of the oldest, largest, and least productive industry in all history.

■ The second most preposterous notion is that copulation is inherently sinful.

■ Writing is not necessarily something to be ashamed of—but do it in private and wash your hands afterwards.

■ A hundred dollars placed at seven percent interest compounded quarterly for two hundred years will increase to more than a hundred million dollars—by which time it will be worth nothing.

■ Dear, don't bore him with trivia nor burden him with your past mistakes. The happiest way to deal with a man is never to tell him anything he does not need to know.

■ Darling, a true lady takes off her dignity with her clothes and does her whorish best. At other times you can be as modest and dignified as your *persona* requires.

■ Everybody lies about sex.

■ If men were the automatons that behaviorists claim they are, the behaviorist psychologists could not have invented the amazing nonsense called "behaviorist psychology." So they are wrong from scratch—as clever and as wrong as phlogiston chemists.

■ The shamans are forever yacking about their snake-oil

"miracles." I prefer the Real McCoy—a pregnant woman.

■ If the universe has any purpose more important than topping a woman you love and making a baby with her hearty help, I've never heard of it.

■ Thou shalt remember the Eleventh Commandment and keep it Wholly.

■ A touchstone to determine the actual worth of an "intellectual"—find out how he feels about astrology.

■ Taxes are not levied for the benefit of the taxed.

■ There is no such thing as "social gambling." Either you are there to cut the other bloke's heart out and eat it—or you are a sucker. If you don't like this choice, don't gamble.

■ When the ship lifts, all bills are paid. No regrets.

■ The first time I was a drill instructor I was too inexperienced for the job—the things I taught those lads must have got some of them killed. War is too serious a matter to be taught by the inexperienced.

■ A competent and self-confident person is incapable of jealousy in anything. Jealousy is invariably a symptom of neurotic insecurity.

■ Money is the sincerest of all flattery.
Women love to be flattered.
So do men.

■ You live and learn. Or you don't live long.

■ Whenever women have insisted on absolute equality with men, they have invariably wound up with the dirty

end of the stick. What they are and what they can do makes them superior to men, and their proper tactic is to demand special privileges, all the traffic will bear. They should never settle merely for equality. For women, "equality" is a disaster.

■ Peace is an extension of war by political means. Plenty of elbow room is pleasanter—and much safer.

■ One man's "magic" is another man's engineering. "Supernatural" is a null word.

■ The phrase "we (I) (you) simply *must*—" designates something that need not be done. "That goes without saying" is a red warning.

■ "Of course" means you had best check it yourself. These small-change clichés and others like them, when read correctly, are reliable channel markers.

■ Don't handicap your children by making their lives easy.

■ Rub her feet.

■ If you happen to be one of the fretful minority who can do creative work, never force an idea; you'll abort it if you do. Be patient and you'll give birth to it when the time is ripe. Learn to wait.

■ Never crowd youngsters about their private affairs—sex especially. When they are growing up, they are nerve ends all over, and resent (quite properly) any invasion of their privacy. Oh, sure, they'll make mistakes—but that's *their* business, not yours. (You made your own mistakes, did you not?)

■ Never underestimate the power of human stupidity.

■ Always tell her she's beautiful, especially if she's not.

■ If you are part of a society that votes, then do so. There may be no candidates and no measures you want to vote *for* . . . but there are certain to be ones you want to vote *against.* In case of doubt, vote *against.* By this rule you will rarely go wrong.

If this is too blind for your taste, consult some well-meaning fool (there is always one around) and ask his advice. Then vote the other way. This enables you to be a good citizen (if such is your wish) without spending the enormous amount of time on it that truly intelligent exercise of franchise requires.

■ Sovereign ingredient for a happy marriage: Pay cash or do without. Interest charges not only eat up a household budget; awareness of debt eats up domestic felicity.

■ Those who refuse to support and defend a state have no claim to protection by that state. Killing an anarchist or a pacifist should not be defined as "murder" in a legalistic sense. The offense against the state, if any, should be "Using deadly weapons inside city limits," or "Creating a traffic hazard," or "Endangering bystanders," or other misdemeanor.

However, the state may reasonably place a closed season on these exotic asocial animals whenever they are in danger of becoming extinct. An authentic buck pacifist has rarely been seen off Earth and it is doubtful that any have survived the troubles there . . . regrettable, as they had the biggest mouths and the smallest brains of any of the primates.

The small-mouthed variety of anarchist has spread through the galaxy at the very wave front of the Diaspora; there is no need to protect them. But they often shoot back.

■ Another ingredient for a happy marriage: Budget the luxuries *first!*

■ And still another: See to it that she has her own desk—then keep your hands off it!

■ And another: In a family argument, if it turns out you are right—apologize at once!

■ "God split himself into a myriad parts that he might have friends." This may not be true but it sounds good—and is no sillier than any other theology.

■ To stay young requires unceasing cultivation of the ability to unlearn old falsehoods.

■ Does history record *any* case in which the majority was right?

■ When the fox gnaws—*smile!*

■ A "critic" is a man who creates nothing and thereby feels qualified to judge the work of creative men. There is logic in this; he is unbiased—he hates all creative people equally.

■ Money is truthful. If a man speaks of his honor, make him pay cash.

■ Never frighten a little man. He'll kill you.

■ Only a sadistic scoundrel—or a fool—tells the bald truth on social occasions.

■ This sad little lizard told me that he was a brontosaurus on his mother's side. I did not laugh; people who boast of ancestry often have little else to sustain them. Humoring

them costs nothing and adds to happiness in a world in which happiness is always in short supply.

■ In handling a stinging insect, move very slowly.

■ To be "matter of fact" about the world is to blunder into fantasy—and dull fantasy at that, as the real world is strange and wonderful.

■ The difference between science and the fuzzy subjects is that science requires reasoning, while those other subjects merely require scholarship.

■ Copulation is spiritual in essence—or it is merely friendly exercise. On second thought, strike out "merely." Copulation is not "merely"—even when it is just a happy pastime for two strangers. But copulation at its spiritual best is so much more than physical coupling that it is different in kind as well as in degree.

The saddest feature of homosexuality is not that it is "wrong" or "sinful" or even that it can't lead to progeny—but that it is more difficult to reach through it this spiritual union. Not impossible—but the cards are stacked against it.

But—most sorrowfully—many people never achieve spiritual sharing even with the help of male-female advantage; they are condemned to wander through life alone.

■ Touch is the most fundamental sense. A baby experiences it, all over, before he is born and long before he learns to use sight, hearing, or taste, and no human ever ceases to need it. Keep your children short on pocket money—but long on hugs.

■ Secrecy is the beginning of tyranny.

■ The greatest productive force is human selfishness.

■ Be wary of strong drink. It can make you shoot at tax collectors—and miss.

■ The profession of shaman has many advantages. It offers high status with a safe livelihood free of work in the dreary, sweaty sense. In most societies it offers legal privileges and immunities not granted to other men. But it is hard to see how a man who has been given a mandate from on High to spread tidings of joy to all mankind can be seriously interested in taking up a collection to pay his salary; it causes one to suspect that the shaman is on the moral level of any other con man.

But it's lovely work if you can stomach it.

■ A whore should be judged by the same criteria as other professionals offering services for pay—such as dentists, lawyers, hairdressers, physicians, plumbers, et cetera. Is she professionally competent? Does she give good measure? Is she honest with her clients?

It is possible that the percentage of honest and competent whores is higher than that of plumbers and much higher than that of lawyers. And *enormously* higher than that of professors.

■ Minimize your therbligs until it becomes automatic; this doubles your effective lifetime—and thereby gives time to enjoy butterflies and kittens and rainbows.

■ Have you noticed how much they look like orchids? Lovely!

■ Expertise in one field does not carry over into other fields. But experts often think so. The narrower their field of knowledge the more likely they are to think so.

■ Never try to out-stubborn a cat.

■ Tilting at windmills hurts you more than the windmills.

■ Yield to temptation; it may not pass your way again.

■ Waking a person unnecessarily should not be considered a capital crime. For a first offense, that is.

■ "Go to Hell!" or other direct insult is all the answer a snoopy question rates.

■ The correct way to punctuate a sentence that starts: "Of course it is none of my business but—" is to place a period after the word "but." Don't use excessive force in supplying such moron with a period. Cutting his throat is only a momentary pleasure and is bound to get you talked about.

■ A man does not insist on physical beauty in a woman who builds up his morale. After a while he realizes that she *is* beautiful—he just hadn't noticed it at first.

■ A skunk is better company than a person who prides himself on being "frank."

■ "All's fair in love and war"—what a contemptible lie!

■ Beware of the "Black Swan" fallacy. Deductive logic is tautological; there is no way to get a new truth out of it and it manipulates false statements as readily as true ones. If you fail to remember this, it can trip you—with perfect logic. The designers of the earliest computers called this the "Gigo Law," that is, "Garbage in, garbage out."

Inductive logic is *much* more difficult—but can produce new truths.

■ A "practical joker" deserves applause for his wit according to its quality. Bastinado is about right. For exceptional wit one might grant keelhauling. But staking him out on an ant hill should be reserved for the very wittiest.

■ Natural laws have no pity.

■ On the planet Tranquille around KM849(G-O) lives a little animal known as a "knafn." It is herbivorous and has no natural enemies and is easily approached and may be petted—sort of a six-legged puppy with scales. Stroking it is very pleasant; it wiggles its pleasure and broadcasts euphoria in some band that humans can detect. It's worth the trip.

Someday some bright boy will figure out how to record this broadcast, then some smart boy will see commercial angles—and not long after that it will be regulated and taxed.

In the meantime I have faked that name and catalog number; it is several thousand light-years off in another direction.

Selfish of me—

■ Freedom begins when you tell Mrs. Grundy to go fly a kite.

■ Take care of the cojones and the frijoles will take care of themselves. Try to have get-away money—but don't be fanatic about it.

■ If "everybody knows" such-and-such, then it ain't so, by at least ten thousand to one.

■ Political tags—such as royalist, communist, democrat, populist, fascist, liberal, conservative, and so forth—are never basic criteria. The human race divides

politically into those who want people to be controlled and those who have no such desire. The former are idealists acting from highest motives for the greatest good of the greatest number. The latter are surly curmudgeons, suspicious and lacking in altruism. But they are more comfortable neighbors than the other sort.

■ All cats are *not* gray after midnight. Endless variety—

■ Sin lies only in hurting other people unnecessarily. All other "sins" are invented nonsense. (Hurting yourself is not sinful—just stupid.)

■ Being generous is inborn; being altruistic is a learned perversity. No resemblance—

■ It is impossible for a man to love his wife wholeheartedly without loving all women somewhat. I suppose that the converse must be true of women.

■ You can go wrong by being too skeptical as readily as by being too trusting.

■ Formal courtesy between husband and wife is even more important than it is between strangers.

■ Anything free is worth what you pay for it.

■ Don't store garlic near other victuals.

■ Climate is what we expect, weather is what we get.

■ Pessimist by policy, optimist by temperament—it is possible to be both. How? By never taking an unnecessary chance and by minimizing risks you can't avoid. This permits you to play out the game happily, untroubled by the certainty of the outcome.

■ Do not confuse "duty" with what other people expect of you; they are utterly different. Duty is a debt you owe to yourself to fulfill obligations you have assumed voluntarily. Paying that debt can entail anything from years of patient work to instant willingness to die. Difficult it may be, but the reward is self-respect.

But there is no reward at all for doing what other people expect of you, and to do so is not merely difficult, but impossible. It is easier to deal with a footpad than it is with the leech who wants "just a few minutes of your time, please—this won't take long." Time is your total capital, and the minutes of your life are painfully few. If you allow yourself to fall into the vice of agreeing to such requests, they quickly snowball to the point where these parasites will use up a hundred percent of your time—and squawk for more!

So learn to say No—and to be rude about it when necessary.

Otherwise you will not have time to carry out your duty, nor to do your own work, and certainly no time for love and happiness. The termites will nibble away your life and leave none of it for you.

(This rule does not mean that you must not do a favor for a friend, or even a stranger. But let the choice be *yours*. Don't do it because it is "expected" of you.)

■ "I came, I saw, she conquered." (The original Latin seems to have been garbled.)

■ A committee is a life form with six or more legs and no brain.

■ Animals can be driven crazy by placing too many in too small a pen. Homo Sapiens is the only animal that voluntarily does this to himself.

■ Don't try to have the last word. You might get

The real trap is to be on a world you think *you know well and fully. A strange world you suspect . . .*

TIME CYCLE

SAUL SNATSKY

Time is a watchspring. Coiled and winding around the mists and stars that swim the sea of eternity. It ticks and moves, changing potential into kinetic energy: to power the universe, to assign destinies.

And in this blue time-fog drifts a small lifeboat, enclosing a cylindrical plasm, having appendages and a protuberance at one end—called a head. In this head a mind; it thinks in analog waves pulsed once a second by a feeble pump in its chest. Its name: Jack Haavik (Government Serial Number 7798480X).

Restrained by belts and padding, he watched a greenish video screen from the easy-chair pilot's seat. When the scene below the craft changed from water to shoreline and then into beach, he flipped switch ABLE to STANDBY, and guided the ship lower with the control stick in front of him.

Dry land. This would be called a beach, but there was neither sand, nor bathers, nor sailboats. The place: an unnamed shore on Earth. The time: three billion (or so) B.C.

Jack set switches BAKER and CHARLIE to HOLD, and thus the ship balanced upon flamepoint above the land. As the craft—about the size and shape of two Volkswagen buses welded belly-to-belly—settled, black chips on the granite surface took refuge in the rocky crevices. Kklinkk. Skkraatch. Popp! The vessel had landed and the flame was extinguished.

Haavik, who was a youngish-looking man for his three and a half decades, unstrapped his seat belts and ran the preliminary tests needed for debarkation. True, this was Mother Earth, but at this age she was an energetic tomboy, able to vomit rock and lava from her volcanoes into her poisonous atmosphere: methane, ammonia, carbon monoxide and dioxide. Temperature: forty degrees Centigrade (hot enough!). Radiation: One-half Rem per hour (lead longjohns advised if one lives here). And gravity: one, of course.

Looking from the pilot's viewport, he saw granite monuments to Earth's violent birth, standing guard over the barren shoreline. From this distance of about one kilometer he could almost see the ocean through the fog vapor, which hung low over the water and extended partly up the beach.

The rocks were that good granite and quartz variety that would last for ages—even up to Jack Haavik's time. Of course, there was no vegetation or animal life, and the sea was not only sterile, but even potable, since a few billion years need pass to wash more salts into it. Time is cheap to the unliving.

As he brushed a string of black hair from his thin cream-colored face, he felt that this wide, rocky panorama was more like a theater than a beach. He had always wanted to be an actor. However—and that was a major "however"—

". . . the Government sees that you are most fit to be a Biohistorian." He recollected those words well. They had given him another choice, but it was, stripped of all verbal embellishments, a position equivalent to a dog catcher. Jack never did get along with dogs very well.

He picked up one four-hour oxygen bottle and some sample containers—like those little urine specimen things they hand you, but with hermetic seals—and turned from the pilot's chamber to the upright portal of the air lock/sterile room. He subverbalized: "Might say that I'm at liberty, time-hopping for the experience." And he opened the hatch—"undogged," as he reminded himself that in his age naval jargon was still in vogue, even for space-time ships—with a certain flair innate in his repressed dramatic nature.

Once inside the air lock, he donned a sterile, white, self-contained life-support suit with a fishbowl helmet for his head. He could well have been ready to operate, for outside this ship there was no life; Jack Haavik and the parasitic microbes within his body were the only living things on the Earth. And the sterile chamber and suit were intended to keep it that way.

Before undogging the outer hatch, he activated the ultraviolet, infrared, super what-not sterilizer as a final precaution. A shower nozzle device protruded from the overhead at the pressing of a button, and Jack was transfigured into a purple space monster with one blue bubble eye by the ionizing radiation. Click. Again Jack Haavik—less microbes on his suit surface. The air was also sterile now, and could be dumped from the air lock chamber to the waiting Earth.

Jack glanced at his watch: 1810 hours. Since that was relative to his own time, and the days were much shorter in this epoch, it would just serve as a time reference for his air supply. He intended to stay eight hours, and would need another oxygen bottle when this one expired.

On the top rung of the ladder above the hard basaltic rock below, Jack tried to remember the words of Neil Armstrong, who in the last century had first walked the lunar surface. "One step is a giant . . .; One foot forward . . ." but was unable to complete the phrase. He did think that this scene was not greatly dissimilar from the undeveloped areas of the Moon, except for the atmosphere, water and high gravity.

He slammed the outer door shut, causing a muffled clank, and thought of the nightmare scene of the early Moon explorers, where one would "lose the key" to the craft, and with no possible rescue ship, would slowly die. He didn't worry about a key, and the door was virtually jam-proof, but still there was no rescue ship for him,

and for the same reason implicitly given to the Moon men: too darned expensive! But what could go wrong? There were no hostile beasts, and the time-drive was perfect.

Small chunks of pumice crunched under his white boots, grinding some of them into black soot. And the sample bottles went tinkle-tinkle in the carrying case slung over his back. Tinkle, crunch, tinkle, tinkle, crunch, tinkle, crunch. The man walked to the ocean.

Jack hadn't seen it from his viewport, but on the surface of the rocks were small puddles of water. "Probably rained here last night," he told his faceplate. "Funny, rained last night in my time, too." This was another reason that a man was sent instead of just a machine. A man would always be subjective to those things that a machine would just compile as statistical data. He turned down the air temperature control in his suit, as the heat of young Sol burned through.

Although Jack was not the first biohistorian, nor was this his first trip, it was the farthest "back" anyone had ever gone. He was not at all thrilled about it.

The unmarked path to the sea was a hopscotch across large, flat boulders, punctuated here and there by upright and semi-reclining monoliths several meters high. Rather than a stroll to the beach across soft sand, it was the hopping of a flea across a chessboard, from square to square, avoiding the stone chessmen set in its path. The entire walk was slightly downhill from the ship, and the last few meters plunged sharply down, then leveled out at the maw of the sea.

The little bottles gave a louder tinkle in the sample bag as he jumped the last meter down to the ocean. For an ocean, it seemed unusually calm. More like the man-made Amazon Lake in South America; hardly any tide, but very warm. Jack tested the water on his thermometer, gathered samples into the bottles, and realized that this must be low tide. He thought that it was strange to have assumed it to be high tide when he had first landed.

Although the mist blotted out most of the horizon and ocean as well, he saw a white-cliffed island in the far background. "Didn't notice that when I came down either," he mumbled to himself. "But then the fog and the excitement of going back to three thousand million years before Christ!" he continued with false enthusiasm.

He wondered what ocean this could be, but knew full well that it was both no ocean and every ocean that would be. For in each age the oceans have different boundaries as the land plates shift and slide over the Earth's surface. But even without knowing its name, he felt

melodramatic, and addressed it: "Behold, nameless sea, I have come to conquer thee!"

Jack thought that this would be a great ocean to bathe in, since it was so warm and calm. But, of course, swimming was impossible due to the atmospheric conditions, and he would contaminate it with his body germs. Then again, more foolishly he thought, there's no sand, no snack bars, no people either.

He had gathered half of the samples that were required, needing only to get some air and soil to complete the job. No need to hurry, since he had several hours left. If he got back too soon they might think he hadn't done a good job, and would send him back on an even more worthless mission—or maybe even dangerous. He had hoped that he could advance through the ranks of biohistorians, and in a few years would have a director's job in an office. "Dinosaurs! Never again!" he shuddered, thinking of the three trips he'd made into that one-hundred-million-year age of man-eating lizards.

The uphill jaunt back to the timeship was slightly more difficult than he had expected. When he got there, he threw the sample bag into the air lock, repressurized, removed his suit, then collapsed into the spongy pilot's seat. Time for lunch.

He found several food units, not unlike the K-rations of a bygone age, but more concentrated. He chomped into the food bar (Gov. Spec. #9662573 it said on the wrapper), and noted that it tasted like chocolate bacon grease, but then it was only for that day.

"Odd, thinking of this as lunch," he confided to the food unit. Like the "Lunch Bag Theory of Life" story that went around at Bio-HQ. Some guys from another world landed here before there was any life, but were careless, and left the garbage from their lunch. Then it rotted and evolved into higher organisms, and so on. But that begged the question. Like where did the guys with the lunch bag come from? And if they came from a . . . ad infinitum. Russell showed at the beginning of the last century that that was circular logic: it violated the rules of grammar in Logic. 'The statement on the other side of this card is true: The statement on the other side of this card is false.' The paradox of statements that were true intrinsically, but contradicted themselves if each was on opposite sides of a card. The rules of Logic didn't come engraved upon a tablet either, but one had to start somewhere.

What it all boiled down to was that spontaneous evolution was the more reasonable answer. "So send some nut back through time with some sampling tools to find out what's in that primal liquor. Be nice to see what's in it right now, but I'd guess that it's almost pure water, from the looks of it.

"Then send another guy back to another point in the time spiral to take another sample. Eventually, by interpolation, we'll find out exactly—within a few thousand years—when and under what conditions life spontaneously—presumably—arose from Mother Nature's soup. Using this as a basis, we'll have a better understanding of life, and will know under which conditions to expect life to evolve on other planets in the galaxy, if any.

"It all sounds easy and, in fact, isn't too bad. But still a man has to go along. And we could send a guy back to the moment of the 'Big Bang'—at the center of the spiral. The major problem standing in the way is, as one might suspect, money.

"Money seems to be one of the Fundamental Laws, and even more basic than the other laws of science. Take the sound barrier—when your aircraft is going as fast as the air molecules and they can't get out of the way fast enough. So you give somebody enough money, and he'll either build a machine that overcomes the problem by brute force, or will find a new law of physics that cancels the old. That's how the sound barrier, the light barrier, then the ion, and finally now the time barrier were broken. Just time, research, and money and someone will find a way. Should be something pure and pristine—not like money—for such a basic rule. And that's the one barrier that will probably never be broken.

"So we send somebody back to ten billion B.C., it's about three times as far back as this is, but costs about one hundred times as much. That's about the fourth power in money of the multiple in time. Can just see it, like a carnival barker: 'Step right up folks. See the Cre-eee-a-tion! Be there at the Bee-gin-ing! Only one thin three-hundred-billion-bucks!' The trip's gotta be worthwhile, or at least the trade-off between being not too worthwhile and the cost has to be reasonable. Probably the category that this little trip is in."

Jack paused from his ruminations to look at his watch: 2005 hours. He eased out of the seat as though he'd eaten a great meal, grabbed his helmet in one hand, and continued munching on a food unit as he entered the sterile/air lock chamber.

After securing the door behind him, he realized that he really shouldn't have brought the food bar into the chamber, but had done so absently, as he had on his dinosaur tracking expeditions, where contamination was no problem, and the air even breathable, so he could remove the air-conditioned bubble helmet to chomp on a bar. In those times he even took a few with him, just in case something happened and he was stuck outside the ship for an extended period. So

he didn't feel guilty when he stuffed a half-eaten bar into a contamination proof pocket on his suit.

This excursion was for air samples and picture-taking, and he knew that most of it could be done from the ship. But Jack liked the beach—even with no sand or hotdogs. He walked and jumped his way to the shore again.

He noticed that there was a trail made of wet pumice clinging to the rocks. It seemed that another creature might have made this path, but Jack knew that was not only impossible, but highly unwelcome.

He began to follow the other tracks, thinking of the paradox in time involving himself. Simultaneously he was the First Man on Earth and the Last Man on Earth. Somewhat contradictory, but it would seem that way only to a person with tunnel vision through time. He remembered the long, boring sessions in the Theory of Time Travel. Although he had almost flunked the mathematical portion of the class, one phrase remained from the oral explanation: "There can be no contradictions caused by time travel; everything makes sense to at least the next observer in the time serial."

Realizing that he never did ask the instructor whether it was impossible for him to cross paths with himself in time, or, if so, it would somehow be "O.K." with the universe, he thought he saw a lengthening shadow move as he jumped past a granite slab. "What the hell would I say to myself, if I met myself?" he asked reflexively. "And *he* would be looking for me, not vice versa."

Jack was nearing the water again, and the late afternoon blaze of virile Sol lifted more of the poisonous cloak from the land and ocean. The view across the sea was clear now for several kilometers.

Kicking a dark rock, he wished that the time spiral would bend at more recent history: the Soviet revolution, Caesar at the Rubicon, or just a first-nighter by Euripides. By some irony of fate, there were more time crossing points farther back in history—when little was happening that interested him. He stopped to see the stone dive into the water.

Click. A photo. Tri-D and in every wavelength from audio to gamma ray. Pssst. An air sample, Scrape, scrape. A rock sample.

Jack thought that it was a shorter trip to the water than last time. Wasn't that the ledge he'd jumped off? The tide must be rising, he thought. Water was splashing over the edge of the rocks.

"Here I am, big actor," he spoke to the sea through his helmet (Ser. #5695169). The rocks were his stage, the lapping of the water at his feet was applause, and the white island in the distance was a spotlight. It competed with the setting sun to illuminate him. Then as the fog curtain parted more, the is-

land covered more of the horizon than Jack had realized. In fact the island was rising, but not from out of the water.

"Island? Island! That's the Moon!" he said in a loud aside to his audience. "Right, sure. At *this* time it'd be much closer to Earth; it moves away all right, and slowly, but given three billion years . . ." He took a photo.

He realized that he didn't see it from his ship as he came to this time period because he just dropped in from the time stream into the Earth's atmosphere on *this* side of the globe, while the Moon was barely coming around from the other side. A few more photos. He really felt satisfied with himself for the first time since joining the bio-historians. It was beautiful and unexpected. He hardly minded the warm water splashing over his waterproof boots.

Among those undefinables that are called forces, gravity is a seeming paradox. Weaker by scores of negative powers of ten over the pi-meson proton glue in the atomic nucleus, and much more feeble than the relatively limp electromagnetic force holding electrons in orbit, it has infinite range and *never* gives up. Thus it grapples the galaxies, binds the speeding stars in its spider web, and works equally well between lesser sovereigns of the cosmos: the Earth and her sister, the Moon.

They spoke as two girls yet unmarried: "Sister Moon, have you had a fair journey through my night?" said Earth.

"Oh, dear sister, as I have told you since we broke our common umbilicus, that *I too* can make night and day. Furthermore, I will have children who will feed from my breast, and will erect monuments to glorify me," Moon replied.

"But since our cleavage your air becomes stale, your countenance pock-marked, and you have not even water to wash the mask of death sleep from it."

"Then forevermore I shall remind the creatures of your skin that I was once part of the soil they stand upon. The waters shall arise and fall with regularity as I pass. The small and the large will stand in awe of the lunar tide. Unrelentingly and mercilessly it will wash history upon your shores."

Although the sight of this stone behemoth did not frighten Jack, he did sense an aura of morbid magnetism toward the dead planet; as though its gravity were singularly pulling him from all the bumps and rubble on Earth. More to the point however, it was pulling the ocean up, causing the tide to rise. He noticed the speed at which it moved, and realized that the tides at this time must be more violent than the ones he'd known in his own time, since the Moon was closer to the Earth. He started to walk back.

Each successive wave seemed to cover twice the distance of the preceding one, making it impossible for him to get fully out of the water. And adding this to the slippery, wet and unfriendly rocks made the kilometer back seem impossibly distant.

Crawling, falling, stepping, stumbling and dog-paddling in the warm tide he barely made any progress, as each meter gained was often penalized by one lost in the undertow.

The waves were splashing the shore with greater regularity; some with such impatience that they didn't wait for their predecessors to retreat. An aquatic rat race.

By now the sun was setting, and it became dusk, so that the Moon was even more bright and threatening. And in that light it might have looked like a night football game—with one player running for his life away from the overpowering strength of the other team. The low rock-stubbled hills around that beach wash were cheering stands of spectators, and the hard granite was covered with black glass pebbles, upon which stood here and there tough, immobile obstacles to block his path. The tide continued the offensive.

From behind, a wave tackled him, and like an octopus with a rubber arm whiplashed him against a granite stanchion. With just enough strength not to fumble he clung to the rock like a four-armed starfish as the water crashed over his head, baptizing him in the sterile liquor.

Of all his troubles his least concern was that of tearing his Super-Tuffknit life-support suit, or that of drowning. But the soft little body inside the suit was sensitive to the concussions.

When the sea receded momentarily it exposed his globe helmet to the glint of yellow moonfire, and he turned to look for his timeship. The waves had reached half-way up the beach toward it. Then with a quick push from his rock he paddled a few meters to another fortress against the aqueous assault.

Even with his brain below the waterline, it functioned in self-criticism-pity. "Of all the idiotic things! I could have imagined volcanoes, earthquakes, or radiation storms. But *this!*"

Although the sun had ducked behind the Earth during this part of its sixteen-hour cycle, the lunar light—partly eclipsed by Earth's shadow—still made it as bright as early morning. He checked his watch: 2100 hours. Only one more hour of air left in the suit tank—maybe less than that due to his prodigious oxidation rate in the struggle to survive. The inside of his face plate was fogged, even with air-conditioning to dehumidify his breath. It was only five hundred meters to the ship, but time was in favor of the other side.

The water averaged waist deep at

that point, and in a brief pause from the defense, he stood up fully from a crouch to see that the sea had reached the base of his craft, but, as though the water didn't know he had called a time-out, it rushed him from behind, lifting his body like a cork in a mercury tank. Jack's last view before striking solid resistance was a wave battering the ship. Something gave a dull crack inside his chest, but he was too concerned with thoughts of the craft to notice. When the water receded again, he fully expected to see it being dragged to sea like a tinkertoy left in the sand by a careless child.

The ship was still there, and so was a sharp pain caused by the last tackle. He now had a cracked rib, which made breathing painful, but even with this debilitation he felt encouraged by the craft's resistance to the ocean.

Although the last few hundred meters to the ship were clear of large boulders, and thus he had no protection against the onslaught, an idea touched his brow.

The Moon was now completely above the horizon. A grand disk eyeing warm Earth with envy, trying to pull her life-giving sea to its parched skin. And like a fanatic, knowing that it could never attain its goal, it tried even harder.

Its craters were very prominent and clear against the ochre soil, and by careful inspection one could see the shadows cast by the deeper ones. And it was so close that a space pilot going there by conventional means would certainly have started his retro-rockets to avoid a crash. The scene was like that of the Last Man on Earth running for his spaceship to escape the consequences of a tragic chapter in some *"When Worlds Collide"* serial.

Jack buoyed himself up with a slow deep breath from his compressed-oxygen tank, and dove into the next wave that battered his island fortress. It carried him like a surfer to within a few meters of the timeship, then, realizing that it was unwittingly helping him, tried to pull him back to sea. But he clung to the crevices with rubber boots and gloved fingers. Then he lurched forward to the goal post marked by the ship's ladder.

It hurt to climb, but like a lame kangaroo he hobbled up, pried open the latch and stepped inside. The water mark had already passed the base of the door on its last rush, and before he could dog it shut again, the sea, as if in one final attempt to kill him, blasted its way in, filling the air lock. Earth wanted him to take home a good water sample. Thanks.

The ship was now a metal buoy cast into the shallow end of a swimming pool, tilting, scraping the rock, and making metallic noises, but wouldn't capsize, as it was half submerged and supported by water on all sides. But neither would the

water drain back to sea. And it was rising.

Jack struggled to close the hatch without really thinking how much worse or better his situation would be after he had entombed himself. But this water-logged diving bell at least gave him a respite from the battle and a moment of nonpanic. He leaned against the steel bulkhead of this very private fish tank. Primary specimen: himself.

He panted painfully, still fogging his helmet, as three words assembled in his cerebrum: What to do? Answers: One—stay in the air lock until the next low tide, then open the outer hatch to let the water run out. Two—open the pilot's compartment, let the water fill it too.

The first choice was no good, he realized, because there was less than an hour's air in the suit tank. And even if he were able to reach the extra air tank in the pilot's room, that would only add up to five hours. Suppose the next low tide was a long way off? He remembered the wet rocks he'd seen upon landing and figured that with the heat of the sun it should have burned off in a short while. Probably high tide would last all night—about eight hours—then retreat again as quickly as it had advanced.

The second choice was equally bad, but it had a working chance. If the equipment in the control chamber got wet, it still might function. After all, he only needed a short burst of timedrive power to return home; and the rocket drive was unnecessary, although useful for maneuvering once he had broken through the time barrier. And this sea water was rather pure and non-conductive, unlike the very salty ocean of his time. But to calculate the odds and to roll the dice are not the same proposition.

"What I need to do is to pump the goddam water out!" he told himself, emphasizing the point by banging a plastic fist into the bulkhead. Returning shock waves crossed the radially one-meter chamber to ripple at his neck. "Pump the water out. Might work."

The unhappy white turtle splashed across his aquarium to snap the "AIR EXH" to "ON." He waited expectantly as the water started to gurgle out, and was ready to stand in the winner's circle just before the bubbling stopped. The water was still hip deep.

"Oh, Christ!" he sputtered. "There's a vacuum above the water line, and no air pressure to push it out." It was like being at the base of a catsup bottle with the top end down and open. A little will run out if one pokes a finger into the neck, or bangs the bottle, but not fast. To make matters worse, the air exhaust pumps hadn't been designed as water syphons, but did an excellent job at evacuating air.

Not beaten yet, he reached for the "AIR INT" and set it to "ON" also. Unfortunately, the three ex-

haust vents in the ceiling were oblivious to the difficulties of their companions in the floor, and were pumping air out of the chamber as fast as the air intake system forced it in.

Jack reached up for the exhaust holes in the overhead, and plugged two of them, one with his left and the other with his right outstretched arm and index finger. The water went down another few centimeters, then stopped again.

What would Buzz Spaceman have done in such a situation? Jack visualized the oatmeal opera from childhood days:

Buzz takes out his Magic-Bubble Gum—that all good rocketmen chew—and plugs the hole to save the day and the beautiful girl from the spacemonster who intended to drown them in a watery torture chamber.

"I don't have any bubble gum or a knife to cut my suit for a plug . . . can't cut it anyway . . . the food unit!" he told the wall. A wave of visceral reinforcement gushed through his chest, then into his cortex to reverberate strength to his fingers. The humidity fell in his bubble helmet.

It was nearly raining in the cabin due to the warm water condensing on the ceiling. Rivulets like sweat ran down the walls into the miniature lake. And outside the ship the main battle line of waves fought the rocks for control of the beach several kilometers distant, having subdued and sunk this metal pillar into five fathoms of ocean.

He reached with slippery gloves into his suit pocket, unsealed it, and grabbed the bar, plastering the wrapper over the third exhaust vent with the food as a plug sealer. Then reaching painfully again for the other two outlets, he closed them with his fingers. As though it might help, he pressed his fingers into the holes with such force that they throbbed, and closed his eyes, leaning against the bulkhead.

Sssssss, ggguurgle, buuubbble. The water went home.

When the water level reached a few centimeters deep, he flicked the "AIR INT" to "NORM" and swished the remaining puddles through the deck vents with a club-footed boot. He didn't notice that the food bar had fallen from its perch on the ceiling—due to the more equal pressure on both sides of it and the saturating moisture—until it clogged the floor drain.

As he picked up the wrapper and stuffed it into his vest again, he thought how much had depended upon such a small item. He felt sure that somehow he could have extricated himself from the difficulty by an alternate means, but it was silly to think about it now, since everything was O.K.

It was such a joy to be relatively safe again that he opened his face plate to breathe the ship's air. But the jab of his split rib triggered the realization that the "AIR EXH"

was still "ON" and he quickly snapped it off.

Back inside the pilot's chamber, as he fingered the control switches, he thought about the food bar—ersatz glue—that had washed into the floor vent, and like some of his breath had probably discharged into the sterile sea. Faced with a fact, his mind could sort the pieces of the theoretical jigsaw of the classroom with greater facility.

He knew now what his instructor was expounding when he had lectured on the serial universe. Time travel was a momentary stepping into the next higher plane in the series of space-time boxes that enclosed each other. Anything that one did in the next level was sequential, with respect to the higher time base, to the events in the lower level. A time traveler could theoretically kill his own grandfather, and still himself live.

However, since time was also a spiral, one crossed it only at certain bends; killing one's grandfather could only be done by someone a billion years removed—at the present rate of time curvature—from the current human epoch. Thus the ancestor would not have been a grandfather, but a grandfather N-times removed, and history would simply adjust to the fact.

Jack enabled the "TIME RET" button with a stab of his finger, thinking that this hypothetical murderer would only be playing the role cast for him by a director in the next time level. The traveler's N-th predecessor would always have been killed in such a manner—if anyone bothered to keep records for a billion years.

He sat up straighter in the cockpit throne watching the instrument wink colorful signals that all systems were "GO"—even rocket power. As he activated the "TIME RET" switch, he felt like an ancient king, who, ruling by divine right, could do no wrong.

Kathudd! The craft stepped back into the time stream, and water rushed to take its place.

And in the sea microscopic plasms floated, and a speck of dark nutriment dissolved. ■

Science Fiction on Broadway has been a dismal flop. Here's a suggestion as to why.

LAURENCE M. JANIFER

Into the Furniture

Some years back a TV announcer, or maybe a radio announcer, introduced a kiddie-SF show with one wonderful blooper. "Here we go, boys and girls," he said breathlessly, "twenty thousand years into the furniture."

A little while ago a (theoretically) adult-SF show opened on Broadway. It was called "Via Galactica" and it is now impossible for you to see it, which is just as well and, it might be, a little better. It was not the worst show ever to hit Broadway. It was not even the worst show I have ever seen on Broadway: there have been, and I have sat stunned and disbelieving through, some doozies. But it was, distinctly, lousy. The curtain went up, a Prologue descended from the flies in a small bosun's chair, and off we went, "one thousand years from now," according to the Prologue, smack into the hardwooden furniture. A very little about the show may give you some faint notion:

The hero, Gabriel Finn, was a sanitation man on Earth. He flew around in a spaceship modeled to look like an ancient Ford, with headlights and *ooka-ooka* horn, collecting garbage and then getting rid of it by dumping it into the stratosphere. Earth was in pretty lousy shape, anyhow: everybody was kept happy by revolving cone-shaped hats, which people put on at birth and never, never took off (head size doesn't change? hats expand?) until the age of fifty-five. At fifty-five, everybody committed suicide. Sex was rampant, but babies were decanted or something (I saw this happen on stage but it looked more confusing than I can tell you: the attending doctor put a new hat on the new baby, though). Everybody was blue.

That last is a statement of fact. Blue was the only color Earth people could agree on, and all Earth skins were bright blue.

Ithaca was different, though. Ithaca (Gabriel got hijacked to Ithaca) was a small asteroid, gravity very low (with Earth-normal atmosphere, though) to which a few freedom-loving people had emigrated long ago. Earth managed to lose Ithaca somehow or other, as well as another nearby asteroid called Hy Brasil (described, off-

hand, as lying "to the west" of Ithaca), and Ithaca and Hy Brasil became distant myths. (It is not easy to lose an asteroid, once charted, especially since Earth civilization was spacegoing—a ship arrived on Ithaca near the end of the show in forty-four minutes from Earth takeoff.) The Ithacans converted Gabriel and garnered his genes for their gene pool, since they were about to leave for a new planet circling Aldebaran, in a voyage which will take one hundred years but will seem to them like fourteen months (I think; that got sort of cloudy, too).

Gabriel contributed his genes by going into the hay one (1) time with one (1) woman. He then died heroically fighting off the Earth ship which comes to get the Ithacans, after Earth figured out that Ithaca still existed (and was still where it was charted).

And so on, and so on. Believe me, you did not want to see this show.

Why am I telling you all this?

Seems I described the show to Ben Bova, and got asked why there wasn't any good SF on Broadway, and I said there never had been, and he said I wonder why, and I said damned if I know, but I'll think of something.

What, eventually, I thought of is that we were both wrong. We were also both right.

There has been SF on Broadway. There has been good, and successful, SF on Broadway. But there is not likely to be much more; and a good, successful straight play with an SF theme ("Via Galactica" was a musical, so described) has never happened and is not likely to.

The reasons, I think, are interesting enough to deserve a little space.

The successful jobs are all either musicals ("Connecticut Yankee" with time travel, "On a Clear Day" with psi) or screaming farces (just to start arguments, I'll nominate "Three Men on a Horse" as a psi story, and SF). The failures—and there is quite a list, including Arch Oboler and Ray Bradbury—are mostly straight plays.

Part of the answer is that SF is thought to be a gimmick medium—lots of special effects—and only musicals, generally speaking, can stand the cost of the sets and the effects. (But "Via Galactica" had half a million dollars' worth of effects, all marvelous, and failed; "Connecticut Yankee" and "On a Clear Day" had next to none. "Three Men on a Horse" had none, period.)

Another part is that Broadway has been taken over by the Broadway equivalent of the New Wave: Albee, say, and Hochhuth, and their followers. Not entirely, of course—but enough. And the New Wave is mostly surreal, interested in parable or straight-out lecture and not, definitely not, in the science half of science fiction. The

New Wave hasn't had much effect on TV or the movies yet: that's why we've had "2001" and "Charlie" and, on a much smaller scale, "Star Trek." And, being straight-arrow serious and dedicated, it isn't interested in musicals or farces either, so we have had "On a Clear Day," and a good SF farce is perfectly thinkable: Neil Simon may be working on one now.

Now, the science half of SF isn't a necessity for the printed page, or for the movies either. You can get a reader, or a moviegoer, interested and involved in something having only the faintest relation to reality, as experimental novels and movies show. On Broadway things are different. Broadway cannot distort or ignore reality to nearly so great an extent: it involves real people on a real, visible stage. That much reality demands some measure of reality in the play and the playing, just to make it possible for an audience, seeing the real people, to accept and then get involved in what these people are doing.

There needn't be much reality. "Tiny Alice" is fine, and "The Fantasticks." And so are a lot of even stranger plays, and musicals. But no successful play exists which either contradicts what an audience believes to be reality without offering a pretty solid underpinning of the argument to sustain that contradiction, or which contradicts itself.

Working outside of SF these demands are not so troublesome: the second, in fact, is so much taken for granted that people don't bother to mention it. But in SF the writer is suddenly required to invent relationships between his people, a society for them to live in, and anything else needed, from scratch.

The Broadway New Wave seems to know no science, to begin with; more, it seems to harbor a general belief that conscious logic is not a useful tool. (This also seems true of the SF New Wave, and has many of the same results there.) These qualifications, if that's what they are, provide the writers with a handy shortcut to a number of dead ends: inventing societies that contain self-contradictions, for instance. (On Ithaca, I haven't had room or strength to mention until now, everyone is entirely free; they keep on saying so, and the authors clearly mean me to believe that. But the most noticeable thing about the society is that everyone takes orders at all times and on every subject, without serious demur, from one single man, referred to as the Ithacans' leader.)

There are other dead ends, of course. New Wave authors keep falling into the unamiable habit of making statements without adequate defense (or, indeed, without any defense at all, as in "Via Galactica," throughout) which affront the audience's sense of reality—and

which, therefore, no audience will accept. (Dumping garbage into the stratosphere? A low-gravity asteroid with Earth-normal atmosphere and temperatures, the living surface always faced away from the Earth? And I flatly cannot tell you how much more stuff like this there was.) What an audience perceives as self-contradictory, what it has not been persuaded to accept, it dislikes; and it should.

So the New Wave SF, on Broadway, falls flat. In books, even in movies, it has an arguable place: God knows enough people have argued it. On Broadway it simply does not; except in the millionth case (an author lucky enough, or knowing enough despite the notions of the New Wave, to convince his audience), a straight-play SF appearance on Broadway is going to fail.

Of course a non-New-Wave writer might make it. The odds against it are immense: there are not that many non-New-Wave writers on Broadway and there are not that many plays produced per season. And an SF writer, trying to crack Broadway, is against even bigger odds. All the same . . .

If it happened, I think the SF writer whose (original) play I would most quickly buy a ticket for is Robert Heinlein (closely followed by Ward Moore, Walter Miller and Fred Pohl). And I'd love to see an SF play by, say, Robert Anderson.

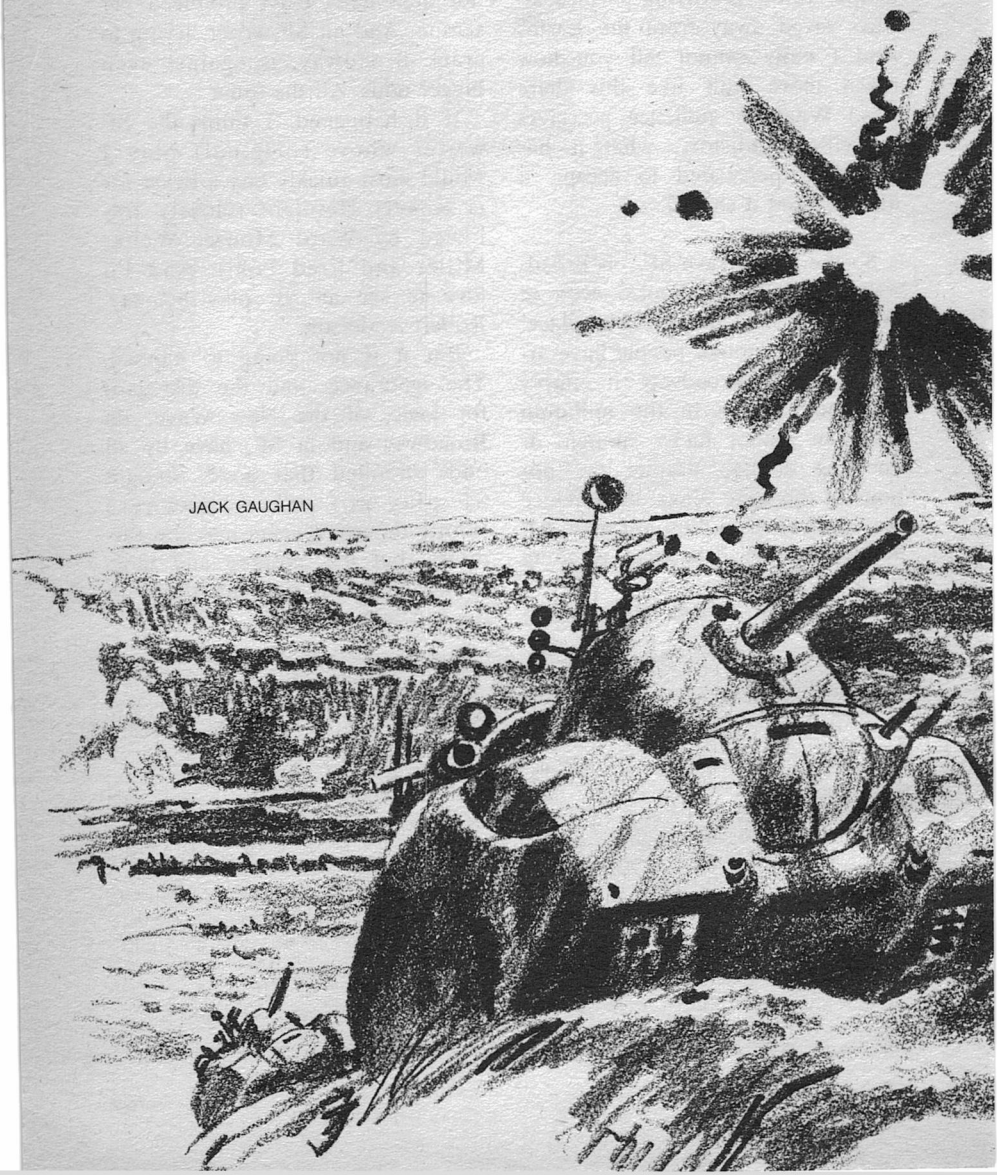
But it is not going to happen. The ignorance, and the disregard for logic, of the New Wave, on Broadway and in SF, have by all odds stranded that good, straight SF play not only somewhere twenty thousand years into the furniture, but flat, gasping and thoroughly doomed, right up there on the beach. ■

IN TIMES TO COME

Anne McCaffrey returns in next month's issue with "A Bridle for Pegasus," which is a sequel to her well-remembered February 1969 novelette, "A Womanly Talent." It's one thing to recognize that psionically talented people exist. It's quite another to teach the gifted how to use their talents. And still *another* thing to learn how to incorporate their talents into society without causing dangerous upheavals. The cover illustration is by Kelly Freas.

July's issue will also feature a novelette by a new writer, Richard K. Lyon. In "The City of Ul Chalan," there is the unlikeliest trio of adventurers ever to trod the slopes of Tibet: a Buddhist monk, a Chinese Communist army officer, and an American CIA agent—female gender, but definitely not the sexy, slinky spy of overworked espionage fiction. Come to think of it, a spy should be virtually an "invisible" person. And that's almost what the heroine of Lyon's story is. Almost.

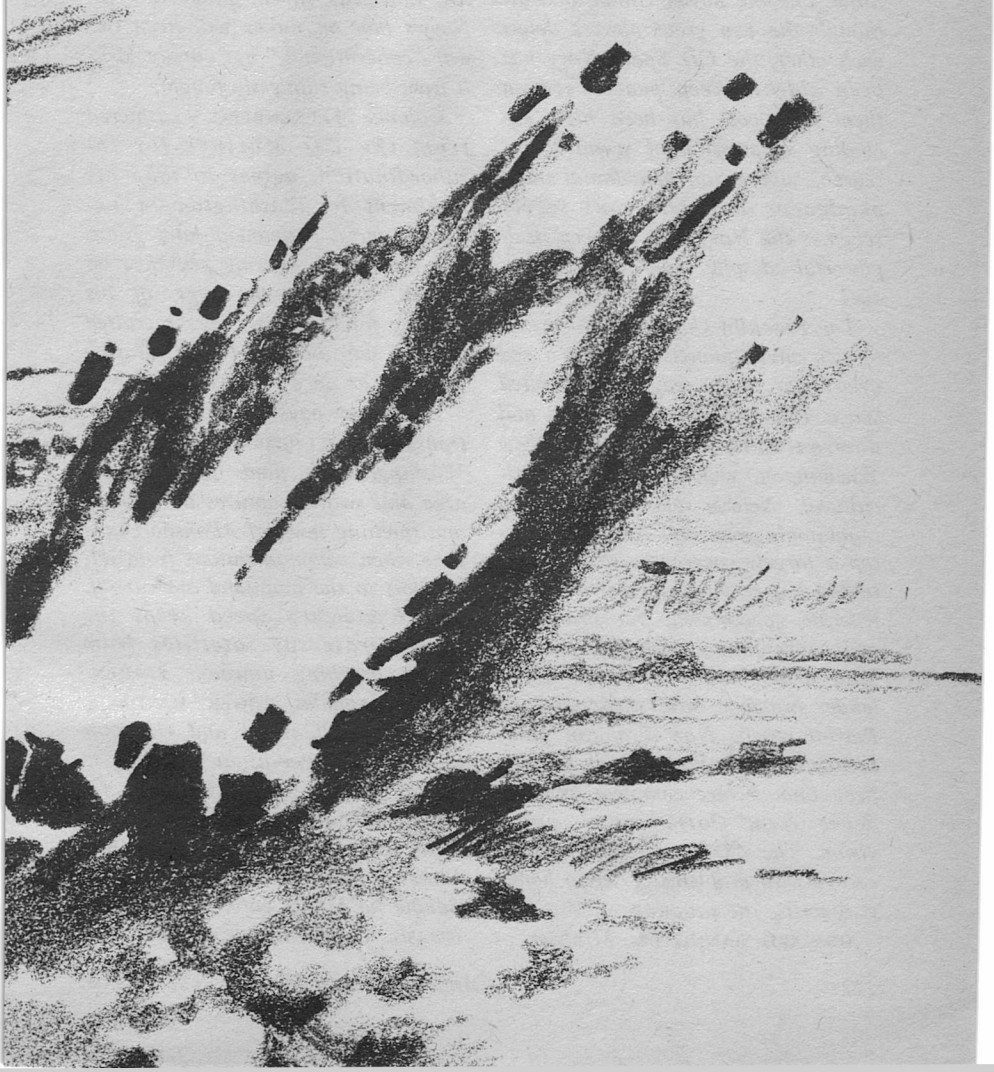
The fact article will be "Rarefied Atmospheres," by Gary E. Myers. And we'll also have as many short stories as we can squeeze in, plus all the usual features.


JACK GAUGHAN

Conclusion. The trick to riding a tiger is to make certain that you don't end up inside the tiger. The trick for the tiger, of course, is to make certain that he gets well fed.

SWORD AND SCEPTER

JERRY POURNELLE



SYNOPSIS

In the closing years of the Twenty-first Century the nearly one hundred inhabited planets are largely dominated by the CoDominium and its Navy. The CD was created by a series of treaties between the United States and the Soviet Union, and although the two great powers detest each other, the CD Space Navy has been able to keep peace between them. The cost has been high, including suppression of scientific research, suppression of colonial independence, and numerous secret schemes the Navy uses to keep itself powerful despite continual budget cuts.

The Franklin Confederacy consists of two small planets orbiting a red dwarf star at the edge of inhabited space. Franklin was settled first, and dominates its twin planet, New Washington, which is largely agricultural. Neither planet has much inhabitable area, and New Washington is largely covered by seas. Washington has revolted against the Confederate government, but Franklin's mercenary armies, particularly Friedland armor and Covenant Highlander infantry, have suppressed the Patriot rebels. Now Franklin plans to exploit New Washington, build a fleet, and declare complete independence from CoDominium supervision. The CD Grand Senate, concerned with problems closer to home, is ignoring the situation.

HOWARD BANNISTER, *Minister of War for the Patriot rebel movement on New Washington, goes to the CD prison planet Tanith and hires the well-equipped but stranded mercenary legion commanded by* JOHN CHRISTIAN FALKENBERG, III. *The rebels have secreted nuclear weapons in the Confederate capital of Franklin, and this threat plus the CD Navy's ban on nukes will keep the war "conventional," but cannot keep it from being ruthlessly fought.*

Colonel FALKENBERG, *cashiered from the CD Marines for insubordination, agrees to take his Regiment to Washington in exchange for a permanent land grant. His former job chasing prisoners on Tanith is taking the edge off his fighting forces, which were recruited around the disbanded CD Marine regiment he once commanded.*

BANNISTER *pays New Jerusalem to transport* FALKENBERG*'s Regiment to Washington. It lands in a remote area and swiftly captures the mining and smelting town of Allansport at a time when communications from Allansport to the mainland are cut off. The Regiment's speed keeps the Confederate spy satellites from seeing anything unusual.* FALKENBERG *persuades* ROGER HASTINGS, *Mayor of Allansport and Governor of the Ranier Peninsula Territory, to act as a hostage for his city. He promises* HASTINGS *that the Regiment will observe the CoDominium Laws of War although the Grand Senate no longer enforces them vigorously.* HASTINGS *has recently been*

elected on a platform of erasing the hatreds caused by the previous rebellion, and hopes to see Loyalists and Patriots united again.

After Allansport is secured, Minister BANNISTER *argues that* FALKENBERG *should liberate Ford Heights' Plateau, a strong Patriot area, but the colonel chooses to assault the powerful Confederate fortress at Astoria. Astoria is the key to the Columbia River Valley and dominates much of New Washington's agricultural area.*

FALKENBERG *makes contact with* GLENDA RUTH HORTON, *leader of the Columbia Valley ranchers.* GLENDA RUTH, *like* HOWARD BANNISTER, *does not like mercenaries, but knows they are necessary to win freedom from Franklin's policies.*

Astoria falls to ruse and surprise, and FALKENBERG*'s men knock down the Confederate spy satellites at the same time. Now that the Confederates are aware that there is a new rebellion,* FALKENBERG *takes desperate chances. He risks the Regiment by flinging it northward along the Columbia Valley, while sending Major* JEREMY SAVAGE *northeast with all available artillery and heavy weapons.* SAVAGE *must secure the passes leading to the Confederate seat of government on New Washington; if he fails, or if* GLENDA RUTH*'s irregulars cannot bring up sufficient supplies, the Friedland armored brigade will catch* FALKENBERG*'s strung out forces and destroy them.*

Part 2

VI

Hillyer Gap was a six-kilometer-wide hilly notch in the high mountain chain. The Aldine Mountains ran roughly northwest to southeast, and were joined at their midpoint by the southward-stretching Temblors. Just at the join was the Gap, which connected the capital city plain to the east with the Columbia Valley to the west.

Major Jeremy Savage regarded his position with satisfaction. He not only had the twenty-six guns taken from the Friedlanders at Astoria, but another dozen captured in scattered outposts along the lower Columbia, and all were securely dug in behind hills overlooking the Gap. Forward of the guns were six companies of infantry, Second Battalion and half of Third, with a thousand ranchers behind in reserve.

"We won't be outflanked, anyway," Centurion Bryant observed. "Ought to hold just fine, sir."

"We've a chance," Major Savage agreed. "Thanks to Miss Horton. You must have driven your men right along."

Glenda Ruth shrugged. Her irregulars had run low on fuel a hundred and eighty kilometers west of the Gap, and she'd brought them on foot in one forced march of thirty hours after sending her ammunition supplies ahead with the

last drops of gasoline. "I just came on myself, Major. Wasn't a question of driving them, the men followed right enough."

Jeremy Savage looked at her quickly but there was no trace of laughter. The slender girl was not very pretty at the moment, with her coveralls streaked with mud and grease, her hair falling in strings from under her cap, but he'd rather have seen her than the current Miss Universe. With her troops and ammunition supplies he had a chance to hold this position. "I suppose they did at that." Centurion Bryant turned away quickly with something caught in his throat.

"Can we hold until Colonel Falkenberg gets here?" Glenda Ruth asked. "I expect them to send everything they've got."

"We sincerely hope they do," Jeremy Savage answered. "It's our only chance, you know. If that armor gets onto open ground . . ."

"There's no other way onto the plains, Major," she replied. "The Temblors go right on down to the Matson swamplands, and nobody's fool enough to risk armor there. Great Bend's Patriot country. Between the swamps and the Patriot irregulars it'd take a week to cross the Matson. If they're comin' by land, they're comin' through here."

"And they'll be coming," Savage finished for her. "They'll want to relieve the Doak's Ferry fortress before we can get it under close siege. At least that was John Christian's plan, and he's usually right."

Glenda Ruth used her binoculars to examine the road. There was nothing out there—yet. "This colonel of yours. What's in this for him? Nobody gets rich on what we can pay."

"I should think you'd be glad enough we're here," Jeremy said.

"Oh, I'm glad all right. In two hundred and forty hours Falkenberg's isolated every Confederate garrison west of the Temblors. The capital city forces are the only army left to fight—you've almost liberated the planet in one campaign."

"Luck," Jeremy Savage murmured. "Lots of it, all good."

"Heh." Glenda Ruth was contemptuous. "I don't believe that, no more do you. Sure, with the Confederates scattered out on occupation duty anybody who could get troops to move fast enough could cut the Feddies up before they got into big enough formations to resist. The fact is, Major, nobody believed that could be done except on maps. Not with real troops—and he did it. That's genius, not luck."

Savage shrugged. "I wouldn't dispute that."

"No more would I. Now answer this. Just what is a real military genius doing commanding mercenaries on a jerkwater agricultural planet? A man like that should be Lieutenant General of the CoDominium."

"The CD isn't interested in military genius, Miss Horton. The Grand Senate wants obedience, not competence."

"Maybe. I hadn't heard Lermontov was a fool and they made him Grand Admiral. O.K., the CoDominium had no use for Falkenberg. But why Washington, Major? With that Regiment you could take nearly anyplace but Sparta, and give the Brotherhoods a run for it there." She swept the horizon with the binoculars, and Savage could not see her eyes.

The girl disturbed him. No other Free State official questioned the good fortune of hiring Falkenberg. "The Regimental council voted to come here because we were sick of Tanith, Miss Horton."

"Yeah. Look, I better get some rest if we've got a fight coming—and we do. Look just at the horizon on the left side of the road." As she turned away Centurion Bryant's communicator buzzed. The outposts had spotted the scout elements of an armored force.

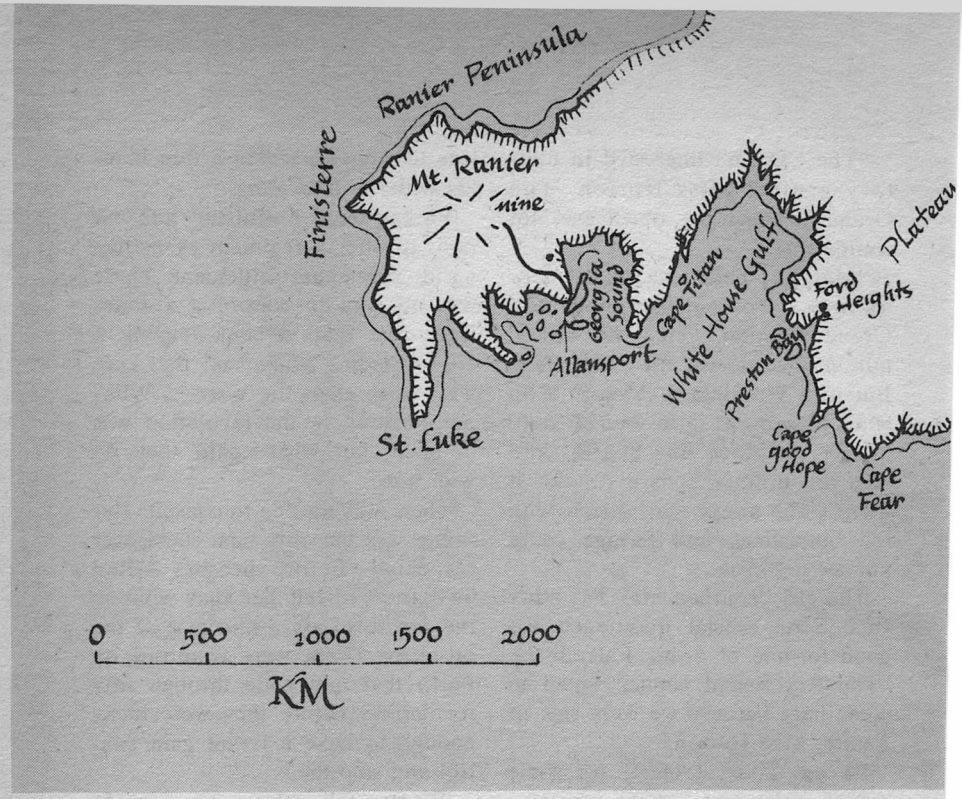
Glenda Ruth walked carefully to her bunker. Born on New Washington, she was used to the planet's forty-hour rotation period, and the forced march hadn't been as hard on her as some others, but lack of sleep made her almost intoxicated even so. She acknowledged the greeting of her bunker guards—her ranchers didn't use military formalities like salutes—and stumbled inside to wrap herself in a thin blanket without undressing.

Falkenberg. Bannister had no right to offer a regiment of mercenaries permanent settlement. There was no way to control a military force like that without keeping a large standing army, and that cure was worse than the disease. Without Falkenberg the revolution was doomed, but what could they do with him?

There was no one to consult. Her father was the only man she'd ever respected. Before he was killed he'd tried to tell her that winning the war was only a thin part of the problem. There were countries on Earth that had gone through fifty revolutions before they were lucky enough to have a tyrant gain control and stop them.

As she fell asleep the thought she'd tried to avoid poured past her guard. What if we can't get better than what we had? In her dreams Falkenberg's hard features formed in swirling mist. He was wearing military uniform and sat at a desk, Sergeant Major Calvin at his side. "These can live. Kill those. Send these to the mines," Falkenberg ordered.

The big sergeant moved tiny figures which looked like model soldiers, but they weren't all troops. One was her father. Another was a group of ranchers. And they weren't models at all. They were real people reduced to miniatures whose screams could barely be

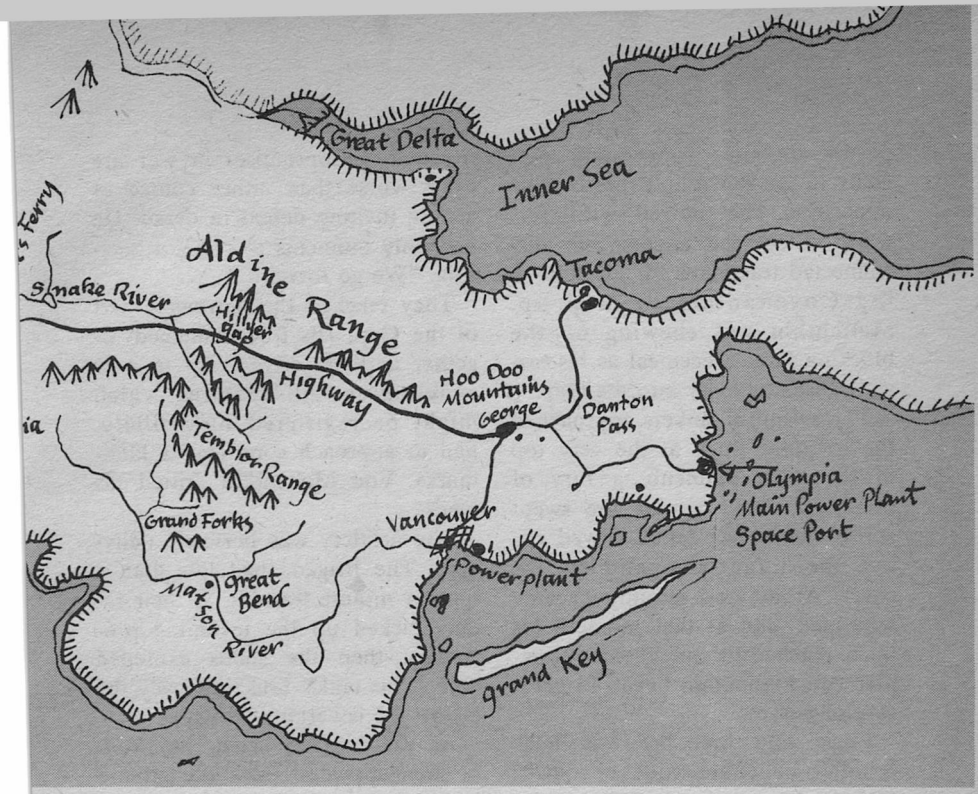


heard as the toneless voice continued to pronounce their dooms . . .

Brigadier Wilfred von Mellenthin waited impatiently for his scouts to report. He had insisted that the Confederacy immediately send his armor west on the report that Astoria had fallen, but the General Staff waited for more information. It was, they said, too big a risk to send the Confederacy's best forces blindly into what might be a trap.

Now the General Staff was convinced that they faced only one regiment of mercenaries, and that must have taken heavy casualties in storming Astoria. Von Mellenthin shrugged. Someone was holding the Gap, and he had plenty of respect for the New Washington ranchers. Give them rugged terrain and they could put up a good fight.

The scouts reported well-dug-in infantry, far more of it than von Mellenthin had expected. That damned Falkenberg—the man had an uncanny ability to move troops. He turned to the chief of staff. "Horst, do you think he has heavy guns here already?"



Oberst Carnap shrugged. *"Weiss nicht,* Brigadier. Every hour gives Falkenberg time to dig in at the Gap, and we have lost many hours."

"Not Falkenberg," Mellenthin corrected. "He is now investing the fortress at Doak's Ferry. We have reports from the Commandant there." He studied the displays on the command table of his caravan. They changed constantly as the scouts sent in reports and staff officers interpreted them.

"We go through," he said in sudden decision, "with everything. Boot them, don't spatter them."

"Jawohl." Carnap spoke quietly into his communicator. "It is my duty to point out the risk, Brigadier. We will take heavy losses if they have brought up artillery."

"I know." Mellenthin regarded the maps again. "But if we fail to get through now, we may never relieve the fortress. Half the war is lost if Doak's Ferry is taken. Better casualties immediately than a long war."

He led the attack himself. His armor brushed aside the infantry screens, his tanks and their sup-

porting infantry cooperating perfectly to pin down and root out the opposition. They moved swiftly forward to cut the enemy into disconnected fragments for the following Covenanters to mop up. Mellenthin was chewing up the blocking force piecemeal as his brigade rushed deeper into the Gap.

The sweating tankers approached the irregular ridge at the very top of the pass. Suddenly a fury of small arms and mortar fire swept across them. The tanks moved on, but the infantry scrambled for cover. Armor and infantry became separated—and at that moment his tanks reached the minefields. Brigadier von Mellenthin began to get a case of nerves.

Logic told him the minefields couldn't be either wide or dense, and if he punched through he would reach the soft headquarters areas of his enemy. Once there his tanks would make short work of the headquarters and depots, the Covenanter infantry would secure the pass, and his Brigade could charge across the open fields beyond.

But—if the defenders had better transport than the General Staff believed, and thus had thousands of mines, he was dooming his armor. Meanwhile his supporting infantry was pinned and taking casualties.

"Send scouting forces," Oberst Carnap urged.

Mellenthin considered it for a moment. Compromises in war are often worse than either course of action, inviting defeat in detail. He had only moments to reach a decision. "We go forward."

They reached the narrowest part of the Gap. His force bunched together and his drivers, up to now avoiding terrain features which might be registered by artillery, had to approach conspicuous landmarks. Von Mellenthin gritted his teeth.

The artillery was perfectly delivered. The Brigade had less than a quarter minute warning as their radars picked up the incoming projectiles, then the shells exploded among his tanks, brushing away the last of the covering infantry.

As the barrage lifted, hundreds of men appeared from the ground itself. A near perfect volley of infantry-carried antitank rockets slammed into his tanks. Then the radars showed more incoming artillery—and swam in confusion.

"*Ja,* that too," von Mellenthin muttered. His counterbattery screens showed a shower of gunk. The defenders were firing chaff, hundreds of thousands of tiny metal chips which drifted slowly to ground. Neither side could now use radar to aim indirect fire—but Mellenthin's armor was under visual observation, while the enemy guns had never been precisely located.

The Brigade was being torn apart on this killing ground. The lead elements ran into more minefields.

Defending infantry crouched in holes and ditches, tiny little groups which his covering infantry could sweep aside in a moment if it could get forward, but the infantry was cut off by the barrages falling behind and around the tanks.

There was no room to maneuver and no infantry support, the classic nightmare of an armor commander. The already rough ground was strewn with pits and ditches. High explosive antitank shells fell all around his force. There were not many hits yet, but any disabled tanks could be pounded to pieces and there was nothing to shoot back at. The lead tanks were under steady fire, and the assault slowed.

The enemy expended shells at a prodigal rate. Could they keep it up? If they ran out of shells it was all over. Von Mellenthin hesitated. Every moment kept his armor in hell.

Doubts undermined his determination. Only the Confederate General Staff told him he faced no more than Falkenberg's Legion, and the Staff was wrong before. Whatever was out there had taken Astoria before the commandant could send a single message. At almost the same moment the observation satellite was killed over Allansport. Every fortress along the Columbia was invested within hours. Surely not even Falkenberg could do that with no more than one regiment!

What was he fighting? If he faced a well-supplied force with transport enough to continue this bombardment for hours, not minutes, the Brigade was lost. His Brigade, the finest armor in the worlds, lost to the faulty intelligence of these damned colonials!

"Recall the force. Consolidate at Station Hildebrand." The orders flashed out, and the tanks fell back, rescuing the pinned infantry and covering their withdrawal. When the Brigade assembled east of the Gap Mellenthin had lost an eighth of his tanks, and he doubted if he would recover any of them.

VII

The honor guard presented arms as the command caravan unbuttoned. Falkenberg acknowledged their salutes and strode briskly into the staff bunker. "Ten-shut!" Sergeant Major Calvin commanded.

"Carry on, gentlemen. Major Savage, you'll be pleased to know I've brought the Regimental artillery. We landed it yesterday. Getting a bit thin, wasn't it?"

"That it was, John Christian," Jeremy Savage answered grimly. "If the battle had lasted another hour we'd have been out of everything. Miss Horton, you can relax now—the colonel said carry on."

"I wasn't sure," Glenda Ruth huffed. She glanced outside where the honor guard was dispersing and scowled in disapproval. "I'd hate to be shot for not bowing properly."

Officers and troopers in the command post tensed, but nothing happened. Falkenberg turned to Major Savage. "What were the casualties, Major?"

"Heavy, sir. We have two hundred and eighty-three effectives remaining in Second Battalion."

Falkenberg's face was impassive. "And how many walking wounded?"

"Sir, that includes the walking wounded."

"I see." Sixty-five percent casualties, not including the walking wounded. "And Third?"

"I couldn't put together a corporal's guard from the two companies. The survivors are assigned to headquarters duties."

"What's holding the line out there, Jerry?" Falkenberg demanded.

"Irregulars and what's left of Second Battalion, Colonel. We are rather glad to see you, don't you know?"

Glenda Ruth Horton had a momentary struggle with herself. Whatever she might think about all the senseless militaristic rituals Falkenberg was addicted to, honesty demanded that she say something. "Colonel, I owe you an apology. I'm sorry I implied that your men wouldn't fight at Astoria."

"The question is, Miss Horton, will yours? I have two batteries of the Forty-second's artillery, but I can add nothing to the line itself. My troops are investing Doak's Ferry, my cavalry and First Battalion are on Ford Heights, and the Regiment will be scattered for three more days. Are you saying your ranchers can't do as well as my mercenaries?"

She nodded unhappily. "Colonel, we could never have stood up to that attack. The Second's senior centurion told me many of his mortars were served by only one man before the battle ended. We'll never have men that steady."

Falkenberg looked relieved. "Centurion Bryant survived, then."

"Why—yes."

"Then the Second still lives. Miss Horton, von Mellenthin won't risk his armor again until the infantry has cleared a hole. Meanwhile, we have the artillery resupplied thanks to your efforts in locating transport. Let's see what we can come up with."

Three hours later the defenses were reorganized. When the final orders were given, Glenda Ruth excused herself. "I have to get my battle armor."

"That seems reasonable, although the bunkers are built well enough."

"I won't be in a bunker, Colonel. I'm going on patrol with my ranchers."

Falkenberg regarded her critically. "I wouldn't think that wise, Miss Horton. Personal courage in a commanding officer is an admirable trait, but—"

"I know." She smiled softly. "But

it needn't be demonstrated because it is assumed, right? Not with us. I can't order the ranchers, and I don't have years of traditions to keep them—that's the reason for all the ceremonials, isn't it?" she asked in surprise.

Falkenberg ignored the question. "The point is, the men follow you, and I doubt they'd fight as hard for me if you're killed—"

"Irrelevant, Colonel. Believe me, I don't want to take this patrol out, but if I don't take the first one there may never be another. We're not used to holding lines, and it's taking some doing to keep my troops steady."

"I'll loan you a centurion and some headquarters guards."

"No. Send the same troops you'll send with any other Patriot force. Oh, damn. John Christian Falkenberg, don't you see why it has to be this way?"

He nodded. "I don't have to like it. All right, get your final briefing from the sergeant major in thirty-five minutes. Good luck, Miss Horton."

The patrol moved silently through low scrub brush. Glenda Ruth led a dozen ranchers and one communications maniple of the Forty-second's band. Sergeant Major Calvin had also assigned Sergeant Hruska to assist. The ranchers carried rifles. Three of Falkenberg's men had automatic weapons, two more had communications gear, and Sergeant Hruska had a submachine gun. It seemed a pitifully small force to contest ground with Covenant Highlanders.

They passed through the final outposts of her nervous ranchers and moved into the valleys between the hills. Glenda Ruth felt completely alone in the total silence of the night. She wondered if the others felt it too. Certainly the ranchers did—what of the mercenaries? They were with comrades who shared their meals and bunkers, and as long as one was alive there would be someone to care. Did they think about such things? She tried to imagine the thoughts of a mercenary private, but it was impossible.

They were nearly a kilometer beyond the lines when she found a narrow gully two meters deep. It meandered down the hillside along the approaches to the outposts behind her, and any attacking force assaulting her sector would have to pass it. She motioned the men into the ditch.

Waiting was hardest of all. The ranchers continually moved about, and she had to crawl along the gully whispering them to silence. Five hours went by, each an agony of waiting, glancing at her watch to see that no time had elapsed since the last time she'd looked, staring out into the night until she could see shapes that weren't there.

In the starlit gloom she could almost see the miniature figures

again. Falkenberg's impassive orders rang in her ears. "Kill this one. Send this one to the mines." Now the miniatures were joined by larger figures in battle armor. With a sudden start she knew they were real. Two men stood motionless in the draw below her.

She touched Sergeant Hruska and pointed. The trooper looked carefully and nodded. As they watched, more figures joined the pair of scouts, until soon there were nearly fifty of them in the fold of the hill, two hundred meters away. They were too far for her squad's weapons to have much effect, and a whispered command sent Hruska crawling along the gully to order the men to stay down and be silent.

The group continued to grow. She couldn't see them all, and since she could count nearly a hundred she must be observing the assembly area of a full company. Were these the dreaded Highlanders? Memories of her father's defeat came unwanted and she brushed them away. They were only hired men—but they fought for glory, and somehow that was enough to make them terrible.

After a long time the enemy began moving toward her. They formed a V-shape with the point aimed almost directly at her position, and she searched for the ends of the formation. What she saw made her gasp.

Four hundred meters to her left was another company of soldiers in double file. They moved silently and swiftly up the hill, and the lead elements were already far beyond her position. Frantically she looked to the right, focusing the big electronic light amplifying glasses—and saw another company of men half a kilometer away. A full Highlander battalion was moving right up her hill in an inverted M, and the group in front of her was the connecting sweep to link the assault columns. In minutes they would be among the ranchers in the defense line.

Still she waited, until the dozen Highlanders of the point were ten meters from her. She shouted commands. "Up and at them! Fire!" From both ends of her ditch the mercenaries' automatic weapons chattered, then their fire was joined by her riflemen. The point was cut down to a man, and Sergeant Hruska directed fire on the main body, while Glenda Ruth shouted into her communicator.

"Fire Mission. Flash Uncle Four!"

There was a moment's delay which seemed like years. "Flash Uncle Four." Another long pause. "On the way," an unemotional voice answered. She thought it sounded like Falkenberg, but she was too busy to care.

"Reporting," she said. "At least one battalion of light infantry in assault columns is moving up hill 905 along ridges Uncle and Zebra."

"They're shifting left, Miss." She looked up to see Hruska. The noncom pointed to the company in front of her position. Small knots of men curled leftward. They hugged the ground and were visible only for seconds.

"Move some men to that end of the gully," she ordered. It was too late to shift artillery fire. Anyway, if the Highlanders ever got to the top of the ridge, the ranchers wouldn't hold them. She held her breath and waited.

There was the scream of incoming artillery, then the night was lit by bright flashes. VT shells fell among the distant enemy on the left flank. "Pour it on!" she shouted into the communicator. "On target!"

"Right. On the way."

She was sure it was Falkenberg himself at the other end. Catlike she grinned in the dark. What was a colonel doing as a telephone orderly? Was he worried about her? She almost laughed at the thought. Certainly he was, the ranchers would be hard to handle without her.

The ridge above erupted in fire. Mortars and grenades joined the artillery pounding the leftward assault column. Glenda Ruth paused to examine the critical situation to the right. The assault force five hundred meters away was untouched, and continued to advance toward the top of the ridge. It was going to be close.

She let the artillery hold its target another five minutes while her riflemen engaged the company in front of her, then took up the radio again. The right-hand column had nearly reached the ridges, and she wondered if she had waited too long.

"Fire mission. Flash Zebra Nine."

"Zebra Nine," the emotionless voice replied. There was a short delay, then, "On the way." The fire lifted from the left flank almost immediately, and two minutes later began to fall five hundred meters to the right.

"They're flanking us, Miss," Sergeant Hruska reported. She'd been so busy directing artillery at the assaults against the ridge line that she'd actually forgotten her twenty men were engaged in a fire fight with over a hundred enemies. "Shall we pull back?" Hruska asked.

She tried to think, but it was impossible in the noise and confusion. The assault columns were still moving ahead, and she had the only group that could observe the entire attack. Every precious shell had to count. "No. We'll hold on here."

"Right, Miss." The sergeant seemed to be enjoying himself. He moved away to direct the automatic weapons and rifle fire. *How long can we hold?* Glenda Ruth wondered.

She let the artillery continue to pound the right-hand assault force

for twenty minutes. By then the Highlanders had nearly surrounded her and were ready to assault from the rear. Prayerfully she lifted the radio again.

"Fire Mission. Give me everything you can on Jack Fire—and for God's sake don't go over. We're at Jack Six."

"Flash Jack Five," the voice acknowledged immediately. There was a pause. "On the way." They were the most beautiful words she'd ever heard.

Now they waited. The Highlanders rose to charge. A wild sound filled the night. *My God, Pipes!* she thought. But even as the infantry moved the pipes were drowned by the whistle of artillery. Glenda Ruth dove to the bottom of the gully, and saw that the rest of her command had done the same.

The world erupted in sound. Millions of tiny fragments at enormous velocity filled the night with death. Cautiously she lifted a small periscope to look behind her.

The Highlander company had dissolved. Shells were falling among dead men, lifting them to be torn apart again and again as the radar-fused shells fell among them. Glenda Ruth swallowed hard and swept the glass around. The left-hand assault company had reformed and were turning back to attack the ridge. "Fire Flash Uncle Four," she said softly.

"Interrogative."

"FLASH UNCLE FOUR!"

"Uncle Four. On the way."

As soon as the fire lifted from behind them her men returned to the lip of the gully and resumed firing, but the sounds began to die away.

"We're down to the ammo in the guns now, Miss," Hruska reported. "May I have your spare magazines?"

She realized with a sudden start that she had yet to fire a single shot.

The night wore on. Whenever the enemy formed up to assault her position he was cut apart by the merciless artillery. Once she asked for a box barrage all around her gully—by that time the men were down to three shots in each rifle, and the automatic weapons had no ammo at all. The toneless voice simply answered, "On the way."

An hour before dawn nothing moved on the hill.

VIII

The thin notes of a military trumpet sounded across the barren hills of the Gap. The ridges east of Falkenberg's battle line lay dead, their foliage cut to shreds by shell fragments, the very earth thrown into crazyquilt craters partly burying the dead. A cool wind blew through the Gap, but it couldn't dispell the smells of nitro and death.

The trumpet sounded again. Fal-

kenberg's glasses showed three unarmed Highlander officers carrying a white flag. An ensign was dispatched to meet them, and the young officer returned with a blindfolded Highlander major.

"Major MacRae, Fourth Covenant Infantry," the officer introduced himself after the blindfold was removed. He blinked at the bright lights of the bunker. "You'll be Colonel Falkenberg."

"Yes. What can we do for you, Major?"

"I've orders to offer a truce for burying the dead. Twenty hours, Colonel, if that's agreeable."

"No. Four days and nights—a hundred and sixty hours, Major," Falkenberg said.

"A hundred and sixty hours, Colonel?" The burly Highlander regarded Falkenberg suspiciously. "You'll want that time to complete your defenses."

"Perhaps. But twenty hours is not enough time to transfer the wounded men. I'll return all of yours—under parole, of course. It's no secret I'm short of medical supplies and they'll receive better care from their own surgeons."

The Highlander's face showed nothing, but he paused. "You wouldn't tell me how many there be?" He was silent for a moment, then speaking very fast, he said, "The time you set is within my discretion, Colonel." He held out a bulky dispatch case. "My credentials and instructions. 'Twas a bloody battle, Colonel. How many of my laddies have ye killed?"

Falkenberg and Glenda Ruth glanced at each other. There is a bond between those who have been in combat together, and it can even include those of the other side. The Covenant officer stood impassively, unwilling to say more, but his eyes pleaded with them.

"We counted four hundred and nine bodies, Major," Glenda Ruth told him gently. "And—" she looked at Falkenberg, who nodded. "We brought in another three hundred and seventy wounded." The usual combat ratio is four men wounded to each killed; nearly sixteen hundred Covenanters must have been taken out of action in the assault. Toward the end the Highlanders were losing men in their efforts to recover their dead and wounded.

"Less than four hundred," the major said sadly. He stood to rigid attention. "Hae your men search the ground well, Colonel. There's aye more o' my lads out there." He saluted and waited for the blindfold to be fixed again. "I thank you, Colonel."

As the mercenary officer was led away Falkenberg turned to Glenda Ruth with a wistful smile. "Try to bribe him with money and he'd challenge me, but when I offer him his men back—" He shook his head sadly.

"Have they really given up?" Glenda Ruth asked.

"Yes. The truce finishes it. Their only chance was to break through before we brought up more ammunition and reserves, and they know it."

"But why? In the last revolution they were so terrible, and now—why?"

"It's the weakness of mercenaries," Falkenberg explained crisply. "The fruits of victory belong to our employers, not us. Friedland can't lose her armor and Covenant can't lose her men, or they've nothing more to sell."

"But they fought before!"

"Sure, in a fluid battle of maneuver. A frontal assault is always the most costly kind of battle. They tried to force the passage and we beat them fairly. Honor is satisfied. Now the Confederacy will have to bring up its own Regulars if they want to force a way through the Gap. I don't think they'll squander men like that, and anyway it takes time. Meanwhile we've got to go to Allansport and deal with a crisis."

"What's wrong there?" she asked.

"This came in regimental code this morning." He handed her a message flimsy.

"FALKENBERG FROM SVOBODA BREAK BREAK PATRIOT ARMY LOOTING ALLANSPORT STOP REQUEST COURT OF INQUIRY INVESTIGATE POSSIBLE VIOLATIONS OF LAWS OF WAR STOP EXTREMELY INADVISABLE FOR ME TO COMPLY WITH YOUR ORDERS TO JOIN REGIMENT STOP PATRIOT ARMY ACTIONS PROVOKING SABOTAGE AND REVOLT AMONG TOWNSPEOPLE AND MINERS STOP MY SECURITY FORCES MAY BE REQUIRED TO HOLD THE CITY STOP AWAIT YOUR ORDERS STOP RESPECTFULLY ANTON SVOBODA BREAK BREAK MESSAGE ENDS"

She read it twice. "My God, Colonel—what's going on there?"

"I don't know," he said grimly. "I intend to find out. Will you come with me as a representative of the Patriot Council?"

"Of course—but shouldn't we send for Howard Bannister? The Council elected him president."

"If we need him we'll get him. Sergeant Major."

"Sir!"

"Put Miss Horton's things on the troop carrier with mine. I'll take the Headquarters Guard platoon to Allansport."

"Sir. Colonel, you'll want me along."

"Will I? I suppose so, Sergeant Major. Get your gear aboard."

"Sir."

"It's probably already there, of course. Let's move out."

The personnel carrier took them to a small airfield where a jet waited. It was one of forty on the planet, and it would carry a hundred men; but it burned fuel needed for ammunition transport. Until the oil fields around Doak's Ferry could be secured it was fuel they could hardly afford.

The plane flew across Patriot-held areas, staying well away from the isolated Confederate strong-

points remaining west of the Gap. Aircraft had little chance of surviving in a combat environment when any infantryman could carry target-seeking rockets, while trucks could carry equipment to defeat airborne countermeasures. They crossed the Columbia Valley and turned southwest over the broad forests of Ford Heights Plateau, then west again to avoid Preston Bay where pockets of Confederates remained after the fall of the main fortress.

"You do the same thing, don't you?" Glenda Ruth said suddenly. "When we assaulted Preston Bay you let my people take the casualties."

Falkenberg nodded. "For two reasons. I'm as reluctant to lose troops as the Highlanders—and without the Regiment you'd not hold the Patriot areas a thousand hours. You need us as an intact force, not a pile of corpses."

"Yes." It was true enough, but those were her friends who'd died in the assault. Would the outcome be worth it? Would Falkenberg *let* it be worth it?

Captain Svoboda met them at the Allansport field. "Glad to see you, sir. It's pretty bad in town."

"Just what happened, Captain?" Svoboda looked critically at Glenda Ruth, but Falkenberg said, "Report."

"Yes, sir. When the provisional governor arrived I turned over administration of the city as ordered. At that time the peninsula was pacified, largely due to the efforts of Mayor Hastings, who wants to avoid damage to the city. Hastings believes Franklin will send a large army from the home planet, and says he sees no point in getting Loyalists killed and the city burned in resistance that won't change the final outcome anyway."

"Poor Roger—he always tried to be reasonable, and it never works," Glenda Ruth said. "But Franklin will send troops."

"Possibly," Falkenberg said. "But it takes time for them to mobilize and organize transport. Continue, Captain Svoboda."

"Sir. The governor posted a list of proscribed persons whose property was forfeit. If that wasn't enough, he told his troops that if they found any Confederate government property, they could keep half its value. You'll see the results when we get to town, Colonel. There were looting and fires which my security forces and the local fire people only barely managed to control."

"Oh, Lord," Glenda Ruth murmured. "Why?"

Svoboda curled his lip. "Looters often do that, Miss Horton. You can't let troops sack a city and not expect damage. The outcome was predictable, Colonel. Many townspeople took to the hills, particularly the miners. They've taken several of the mining towns back."

Captain Svoboda shrugged helplessly. "The railway is cut. The city itself is secure, but I can't say how long. You only left me a hundred and fifty troops to control eleven

thousand people, which I did with hostages. The governor brought another nine hundred men and that's not enough to rule *their* way. He's asked Preston Bay for more soldiers."

"Is that where the first group came from?" Glenda Ruth asked.

"Yes, Miss. A number of them, anyway."

"Then it's understandable if not excusable, Colonel," she said. "Many ranches on Ford Heights were burned out by Loyalists in the first revolution. I suppose they think they're paying the Loyalists back."

Falkenberg nodded. "Sergeant Major!"

"Sir!"

"Put the Guard in battle armor and combat weapons. Captain, we are going to pay a call on your provisional governor. Alert your men."

"Colonel!" Glenda Ruth protested. "You—what are you going to do?"

"Miss Horton, I left an undamaged town, which is now a nest of opposition. I'd like to know why. Let's go, Svoboda."

City Hall stood undamaged among burned-out streets. The town smelled of scorched wood and death, as if there'd been a major battle fought in the downtown area. Falkenberg sat impassive as Glenda Ruth stared unbelievingly at what had been the richest city outside the capital area.

"I tried, Colonel," Svoboda muttered. He blamed himself anyway. "I'd have had to fire on the Patriots and arrest the governor. You were out of communications and I didn't want to take that responsibility without orders. Should I have, sir?"

Falkenberg didn't answer. Possible violations of mercenary contracts were always delicate situations. Finally he said, "I can hardly blame you for not wanting to involve the Regiment in war with our sponsors."

The Patriot irregular guards at City Hall protested as Falkenberg strode briskly toward the governor's office. They tried to bar the way, but when they saw his forty guardsmen in battle armor they moved aside.

The governor was a broad-shouldered former rancher who'd done well in commodities speculation. He was a skilled salesman, master of the friendly grip on the elbow and pat on the shoulder, the casual words in the right places, but he had no experience in military command. He glanced nervously at Sergeant Major Calvin and the grim-faced guards outside his office as Glenda Ruth introduced Falkenberg.

"Governor Jack Silana," she said. "The governor was active in the first revolution, and without his financial help we'd never have been able to pay your passage here, Colonel."

"I see." Falkenberg ignored the governor's offered hand. "Did you authorize more looting, Governor

Silana?" he asked. "I see some's still going on."

"Your mercenaries have all the tax money," Silana protested. He tried to grin. "My troops are being ruined to pay you. Why shouldn't the Fedsymps contribute to the war? Anyway, the real trouble began when a town girl insulted one of my soldiers. He struck her. Some townspeople interfered, and his comrades came to help. A riot started and someone called out the garrison to stop it—"

"And you lost control," Falkenberg said.

"The traitors got no more than they deserve anyway! Don't think *they* didn't loot cities when they won, Colonel. These men have seen ranches burned out, and they know Allansport's a nest of Fedsymp traitors."

"I see." Falkenberg turned to his provost. "Captain, had you formally relinquished control to Governor Silana before this happened?"

"Yes, sir. As ordered."

"Then it's none of the Regiment's concern. Were any of our troops involved?"

Svoboda nodded unhappily. "I have seven troopers and Sergeant Magee in arrest, sir. I've held summary court on six others myself."

"What charges are you preferring against Magee?" Falkenberg had personally promoted Magee once. The man had a mean streak, but he was a good soldier.

"Looting. Drunk on duty. Theft. And conduct prejudicial."

"And the others?"

"Three rapes, four grand theft, and one murder, sir. They're being held for a court. I also request an inquiry into my conduct as commander."

"Granted. Sergeant Major."

"Sir!"

"Take custody of the prisoners and convene a General Court. What officers have we for an investigation?"

"Captain Greenwood's posted for light duty only by the surgeon, sir."

"Excellent. Have him conduct a formal inquiry into Captain Svoboda's administration of the city."

"Sir."

"What will happen to those men?" Glenda Ruth asked.

"The rapists and murderer will be hanged if convicted. Hard duty for the rest."

"You'd hang your own men?" she asked. She didn't believe it and her voice showed it.

"I cannot allow rot in my Regiment," Falkenberg snapped. "In any event the Confederacy will protest this violation of the Laws of War to the CD."

Governor Silana laughed. "We protested often enough in the last revolution, and nothing came of it. I think we can chance it."

"Perhaps. I take it you will do nothing about this?"

"I'll issue orders for the looting to stop."

"Haven't you done so already?"

"Well, yes, Colonel—but the men, well, they're about over their mad now, I think."

"If previous orders haven't stopped it, more won't. You'll have to be prepared to punish violators. Are you?"

"I'll be damned if I'll hang my own soldiers to protect traitors!"

"I see. Governor, how do you propose to pacify this area?"

"I've sent for reinforcements—"

"Yes. Thank you. If you'll excuse us, Governor, Miss Horton and I have an errand." He hustled Glenda Ruth out of the office. "Sergeant Major, bring Mayor Hastings and Colonel Ardway to Captain Svoboda's office."

"They shot Colonel Ardway," Svoboda said. "The mayor's in the city jail."

"Jail?" Falkenberg muttered.

"Yes, sir. I had the hostages in the hotel, but Governor Silana—"

"I see. Carry on, Sergeant Major."

"Sir!"

"What do you want now, you bloody bastard?" Hastings demanded ten minutes later. The mayor was haggard, with several days' growth of stubble, and his face and hands showed the grime of confinement without proper hygiene facilities.

"One thing at a time, Mr. Mayor. Any trouble, Sergeant Major?"

Calvin grinned. "Not much, sir. The officer didn't want no problems with the Guard—Colonel, they got all them hostages crammed into cells."

"What have you done with my wife?" Roger Hastings demanded. "I haven't heard anything for days."

Falkenberg looked inquiringly at Svoboda but got only a headshake. "See to the mayor's family, Sergeant Major. Bring them here. Mr. Hastings, do I understand that you believe this is my doing?"

"If you hadn't taken this city—"

"That was a legitimate military operation. Have you charges to bring against my troops?"

"How would I know?" Hastings felt weak. He hadn't been fed properly for days, and he was sick with worry about his family. As he leaned against the desk he saw Glenda Ruth for the first time. "You too, eh?"

"It was none of my doing, Roger." He had almost become her father-in-law. She wondered where Lieutenant Harley Hastings was. Although she'd broken the engagement long ago and no longer loved him, their fights had mostly been political, and they were still friends. "I'm sorry."

"It was your doing, you and the damned rebels. Oh, sure, you don't like burning cities and killing civilians, but it happens all the same—and you started the war. You can't shed the responsibility."

Falkenberg interrupted him. "Mr. Mayor, we have mutual interests still. This peninsula raises little food, and your people cannot survive without supplies. I'm told over a thousand of your people were killed in the riots, and nearly that many are in the hills. Can you get the automated factories and smelters operating with what's left?"

"After all this you expect me to—I won't do one damn thing for you, Falkenberg!"

"I didn't ask if you would, only if it could be done."

"What difference does it make?"

"I doubt you want to see the rest of your people starving, Mr. Mayor. Captain, take the mayor to your quarters and get him cleaned up. By the time you've done that, Sergeant Major Calvin will know what happened to his family." Falkenberg nodded dismissal and turned to Glenda Ruth. "Well, Miss Horton? Have you seen enough?"

"I don't understand."

"I am requesting you to relieve Silana of his post and return administration of this city to the Regiment. Will you do it?"

Good Lord! she thought. "I haven't the authority."

"You've got more influence in the Patriot army than anyone else. The Council may not like it, but they'll take it from you. Meanwhile, I'm sending for the Sappers to rebuild this city and get the foundries going."

Everything moves so fast. Not even Joshua Horton had made things happen like this man. "Colonel, what is your interest in Allansport?"

"It's the only industrial area we control. There'll be no more military supplies from off-planet. We hold everything west of the Temblors. The Matson Valley is rising in support of the revolution and we'll have it soon. We can follow the Matson to Vancouver and take that—and then what?"

"Why—then we take the capital city! The revolution's over!"

"No. That was the mistake you made last time. Do you really think your farmers, even with the Forty-second, can move onto level, roaded ground and fight set-piece battles? We've no chance under those conditions."

"But—" He was right. She'd always known it. When they defeated the Friedlanders at the Gap she'd dared hope, but the capital plains were not Hillyer Gap. "So it's back to attrition."

Falkenberg nodded. "We do hold all the agricultural areas. The Confederates will begin to feel the pinch soon enough. Meanwhile we chew around the edges. Franklin will have to let go—there's no profit in keeping colonies that cost money. They may try landing armies from the home world, but they'll not take us by surprise and they don't have *that* big an army. Eventually we'll wear them down."

She nodded sadly. It would be a long war after all, and she'd have to be in it, always raising fresh troops as the ranchers began to go home again—it would be tough enough holding what they had when people realized what they were in for. "But how do we pay your troops in a long war?"

"Perhaps you'll have to do without us."

"You know we can't. And you've always known it. What do you want?"

"Right now I want you to relieve Silana. Immediately."

"What's the hurry? As you say, it's going to be a long war."

"It'll be longer if more of the city is burned." He almost told her more, and cursed himself for the weakness of temptation. She was only a girl, and he'd known thousands of them since Grace left him all those years ago. The bond of combat wouldn't explain it, he'd known other girls who were competent officers, many of them—so why was he tempted at all? "I'm sorry," he said gruffly. "I must insist. As you say, you can't do without us."

Glenda Ruth had grown up among politicians, and for four years had been a revolutionary leader herself. She knew Falkenberg's momentary hesitation was important, and that she'd never find out what it meant.

What was under that mask? Was there a man in there making all those whirlwind decisions? Falkenberg dominated every situation he fell into, and a man like that wanted more than money. The vision of Falkenberg seated at a desk pronouncing dooms on her people haunted her still.

And yet. There was more. A warrior leader of warriors who had won the adoration of uneducated privates—and men like Jeremy Savage as well. She'd never met anyone like him.

"I'll do it." She smiled and walked across the room to stand next to him. "I don't know why, but I'll do it. Have you got any friends, John Christian Falkenberg?"

The question startled him. Automatically he answered. "Command can have no friends, Miss Horton."

She smiled again. "You have one now. There's a condition to my offer. From now on, you call me Glenda Ruth. Please?"

A curious smile formed on the soldier's face. He regarded her with amusement, but there was something more as well. "It doesn't work, you know."

"What doesn't work?"

"Whatever you're trying. Like me, you've command responsibilities. It's lonely, and you don't like that. The reason command has no friends, Glenda Ruth, is not merely to spare the commander the pain of sending friends to their death. If you haven't learned the rest of it, learn it now, because

some day you'll have to betray either your friends or your command, and that's a choice worth avoiding."

What am I doing? Am I trying to protect the revolution by getting to know him better—or is he right, I've no friends either, and he's the only man I ever met who could be— She let the thought fade out, and laid her hand on his for a brief second. "Let's go tell Governor Silana, John Christian. And let the little girl worry about her own emotions, will you? She knows what she's doing."

He stood next to her. They were very close and for a moment she thought he intended to kiss her. "No, you don't."

She wanted to answer, but he was already leaving the room and she had to hurry to catch him.

IX

"I say we only gave the Fedsymp traitors what they deserved!" Jack Silana shouted. There was a mutter of approval from the delegates, and open cheers in the bleachers overlooking the gymnasium floor. "I have great respect for Glenda Ruth, but she is not old Joshua," Silana continued. "Her action in removing me from a post given by President Bannister was without authority. I demand that the Council repudiate it." There was more applause as Silana took his seat.

Glenda Ruth remained at her seat for a moment. She looked carefully at each of the thirty men and women at the horseshoe table, trying to estimate just how many votes she had. Not a majority, certainly, but perhaps a dozen. She wouldn't have to persuade more than three or four to abandon the Bannister-Silana faction, but what then? The bloc she led was no more solid than Bannister's coalition. Just who would govern the Free States?

More men were seated on the gymnasium floor beyond the council table. They were witnesses, but their placement at the focus of the Council's attention made it look as if Falkenberg and his impassive officers might be in the dock. Mayor Hastings sat with Falkenberg, and the illusion was heightened by the signs of harsh treatment he'd received. Some of his friends looked even worse.

Beyond the witnesses the spectators chattered among themselves as if this were a basketball game rather than a solemn meeting of the supreme authority for three quarters of New Washington. A gymnasium didn't seem a very dignified place to meet anyway, but there was no larger hall in Astoria Fortress.

Finally she stood. "No, I am not my father," she began. "He would have had Jack Silana shot for his actions!"

"Give it to 'em, Glenda Ruth!" someone shouted from the balcony.

Howard Bannister looked up in surprise. "We will have order here!"

"Hump it, you Preston Bay bastard!" the voice replied. The elderly rancher was joined by someone below. "Damn right, Ford Heights don't control the Valley!" There were cheers at that.

"Order! Order!" Bannister's commands drowned the shouting as the technicians turned up the amplifiers to full volume. "Miss Horton, you have the floor."

"Thank you. What I was trying to say is that we did not start this revolution to destroy New Washington! We must live with the Loyalists once it is over, and—"

"Fedsymp! She was engaged to a Feddie soldier!"

"Shut up and let her talk!"

"Order! ORDER!"

Falkenberg sat motionless as the hall returned to silence and Glenda Ruth tried to speak again. "Bloody noisy lot," Jeremy Savage murmured.

Falkenberg shrugged. "Victory does that to politicians."

Glenda Ruth described the conditions she'd seen in Allansport. She told of the burned-out city, hostages herded into jail cells—

"Serves the Fedsymps right!" someone interrupted, but she managed to continue before her supporters could answer.

"Certainly they are Loyalists. Over a third of the people in the territory we control are. Loyalists are a majority in the capital city. Will it help if we persecute their friends here?"

"We won't ever take the capital the way we're fighting!"

"Damn right! Time we moved on the Feddies."

"Send the mercenaries in there, let 'em earn the taxes we pay!"

This time Bannister made little effort to control the crowd. They were saying what he had proposed to the Council, and one reason he supported Silana was because he needed the governor's merchant bloc with him on the war issue. After the crowd had shouted enough about renewing the war, Bannister used the microphone to restore order and let Glenda Ruth speak.

The Council adjourned for the day without deciding anything. Falkenberg waited for Glenda Ruth and walked out with her. "I'm glad we didn't get a vote today," she told him. "I don't think we'd win."

"Noisy beggars," Major Savage observed again.

"Democracy at work," Falkenberg said coldly. "What do you need to convince the Council that Silana is unfit as a governor?"

"That's not the real issue, John," she answered. "It's really the war. No one is satisfied with what's being done."

"I should have thought we were doing splendidly," Savage retorted. "The last Confederate thrust into the Matson ran into your ambush as planned."

"Yes, that was brilliant," Glenda Ruth said.

"Hardly. It was the only possible attack route," Falkenberg answered. "You're very quiet, Mayor Hastings." They had left the gymnasium and were crossing the parade ground to the barracks where the Friedlanders had been quartered. Falkenberg's troops had it now, and they kept the Allansport officials with them.

"I'm afraid of that vote," Hastings said. "If they send Silana back, we'll lose everything."

"Then support me!" Falkenberg snapped. "My engineers already have the automated factories and mills in reasonable shape. With some help from you they'd be running again. Then I'd have real arguments against Silana's policies."

"But that's treason," Hastings protested. "You need the Allansport industry for your war effort. Colonel, it's a hell of a way to thank you for rescuing my family from that butcher, but I can't do it."

"I suppose you're expecting a miracle to save you?" Falkenberg asked.

"No. But what happens if you win? How long will you stay on the Ranier Peninsula? Bannister's people will be there one of these days—Colonel, my only chance is for the Confederacy to bring in Franklin troops and crush the lot of you!"

"And you'll be ruled from Franklin," Glenda Ruth said. "They won't give you as much home rule as you had last time."

"I know," Roger said miserably. "But what can I do? This revolt ruined our best chance. Franklin might have been reasonable in time—I was going to give good government to everyone. But you finished that."

"All of Franklin's satraps weren't like you, Roger," Glenda Ruth said, "and don't forget their war policies! They'd have got us sucked into their schemes and eventually we'd have been fighting the CoDominium itself. Colonel Falkenberg can tell you what it's like to be victim of a CD punitive expedition!"

"Christ, I don't know what to do," Roger said unhappily.

Falkenberg muttered something which the others didn't catch, then said, "Glenda Ruth, if you will excuse me, Major Savage and I have administrative matters to discuss. I would be pleased if you'd join me for dinner in the officers' mess at 1900 hours."

"Why—thank you, John. I'd like to, but I must see the other delegates tonight. We may be able to win that vote tomorrow."

Falkenberg shrugged. "I doubt it. If you can't win it, can you delay it?"

"For a few days, perhaps—why?"

"It might help, that's all. If you can't make dinner, the Regiment's officers are entertaining guests in the mess until quite late. Will you

join us when you're done politics?"

"Thank you. Yes, I will." As she crossed the parade ground to her own quarters, she wished she knew what Falkenberg and Savage were discussing. It wouldn't be administration—did it matter what the Council decided?

She looked forward to seeing John later, and the anticipation made her feel guilt. *What is there about the man that does this to me? He's handsome enough, broad shoulders and thoroughly military—nonsense. I am damned if I'll believe in some atavistic compulsion to fall in love with warriors, I don't care what the anthropologists say. So why do I want to be with him?* She pushed the thought away. There was something more important to think about. What would Falkenberg do if the Council voted against him? And beyond that, what would she do when he did it?

Falkenberg led Roger Hastings into his office. "Please be seated, Mr. Mayor."

Roger sat uncomfortably. "Look, Colonel, I'd like to help, but—"

"Mayor Hastings, would the owners of the Allansport industries rather have half of a going concern, or all of nothing?"

"What's that supposed to mean?"

"I will guarantee protection of the foundries and smelters in return for a half interest in them." When Hastings looked up in astonishment Falkenberg continued. "Why not? Silana will seize them anyway. If my Regiment is part owner, I may be able to stop him."

"It wouldn't mean anything if I granted it," Hastings protested. "The owners are on Franklin."

"You are the ranking Confederate official for the entire Ranier Peninsula," Falkenberg said carefully. "Legal or not, I want your signature on this grant." He handed Roger a sheaf of papers.

Hastings read them carefully. "Colonel, this also confirms a land grant given by the rebel government! I can't do that!"

"Why not? It's all public land—and that *is* in your power. The document states that in exchange for protection of lives and property of the citizens of Allansport you are awarding certain lands to my Regiment. It notes that you don't consider a previous grant by the Patriot Government to be valid. There's no question of treason—you do want Allansport protected against Silana, don't you?"

"Are you offering to double-cross the Patriots?"

"No. My contract with Bannister specifically states that I cannot be made party to violations of the Laws of War. This document hires me to enforce them in an area already pacified. It doesn't state who might violate them."

"You're skating on damned thin ice, Colonel. If the Council ever saw this paper they'd hang you for treason!" Roger read it again. "I

see no harm in signing, but I tell you in advance the Confederacy won't honor it. If Franklin wins this they'll throw you off this planet—if they don't have you shot."

"Let me worry about the future, Mr. Mayor. Right now *your* problem is protecting your people. You can help with that by signing."

"I doubt it," Hastings said. He reached for a pen. "So long as you know there isn't a shadow of validity to this because I'll be countermanded from the home world—" he scrawled his name and title across the papers and handed them back to Falkenberg.

Glenda Ruth could hear the Regimental party across the wide parade ground. As she approached with Hiram Black they seemed to be breasting their way upstream through waves of sound, the crash of drums, throbbing, wailing bagpipes, mixed with off-key songs from intoxicated male baritones.

It was worse inside. As they entered, a flashing saber swept within inches of her face. A junior captain saluted and apologized in a stream of words. "I was showing Oberleutnant Marcks a new parry I learned on Sparta, Miss. Please forgive me?" When she nodded the captain drew his companion to one side and the saber whirled again.

"That's a Friedland officer—all the Friedlanders are here," Glenda Ruth said. Hiram Black nodded grimly. The captured mercenaries wore dress uniform, green and gold contrasting with the blue and gold of Falkenberg's men. Medals flashed in the bright overhead lights. She looked across the glittering room and saw the colonel at a table on the far side.

Falkenberg and his companion stood when she reached the table after a perilous journey across the crowded floor. Pipers marched past pouring out more sound.

Falkenberg's face was flushed and she wondered if he were drunk. "Miss Horton, may I present Major Oscar von Thoma," he said formally. "Major von Thoma commands the Friedland artillery battalion."

"I—" She didn't know what to say. The Friedlanders were enemies, and Falkenberg was introducing her to the officer as his guest. "My pleasure," she stammered. "And this is Colonel Hiram Black."

Von Thoma clicked his heels. The men stood stiffly until she was seated next to Falkenberg. That kind of chivalry had almost vanished, but somehow it seemed appropriate here. As the stewards brought glasses von Thoma turned to Falkenberg. "You ask too much," he said. "Besides, you may have fired the lands from the barrels by then."

"If we have we'll reduce the price," Falkenberg said cheerfully. He noted Glenda Ruth's puzzled

expression. "Major von Thoma has asked if he can buy his guns back when the campaign is ended. He doesn't care for my terms."

Hiram Black observed drily, "Seems to me the Council's goin' to want a say in fixin' that price, General Falkenberg."

Falkenberg snorted contemptuously. "No."

He is drunk, Glenda Ruth thought. *It doesn't show much, but—do I know him that well already?*

"Those guns were taken by the Forty-second without Council help. I will see to it that they aren't used against Patriots, and the Council has no further interest in the matter." Falkenberg turned to Glenda Ruth. "Will you win the vote tomorrow?"

"There won't be a vote tomorrow."

"So you can't win," Falkenberg muttered. "Expected that. What about the war policy vote?"

"They'll be debating for the next two days—" she looked nervously at Major von Thoma. "I don't want to be impolite, but should we discuss that with him at the table?"

"I understand." Von Thoma got unsteadily to his feet. "We will speak of this again, Colonel. It has been my pleasure, Miss Horton. Colonel Black." He bowed stiffly to each and went to the big center table where a number of Friedland officers were drinking with Falkenberg's.

"John, is this wise?" she asked.

"Some of the Councillors are already accusing you of not wanting to fight—"

"Hell, they're callin' him a traitor," Black interrupted. "Soft on Fedsymps, consortin' with the enemy—they don't even like you recruitin' new men to replace your losses." Black hoisted a glass of whiskey and drained it at one gulp. "I wish some of 'em had been ridin' up the Valley with us! Glenda Ruth, that was some ride. And when Captain Frazer runs out of fuel, Falkenberg tells him, cool as you please, to use bicycles!" Black chuckled in remembrance.

"I'm serious!" Glenda Ruth protested. "John, Bannister hates you. I think he always has." The stewards brought whiskey for Falkenberg. "Wine or whiskey, Miss?" one asked.

"Wine—John, please, they're going to order you to attack the capital!"

"Interesting." His features tightened suddenly and his eyes became alert. Then he relaxed and let the whiskey take effect. "If we obey those orders I'll need Major von Thoma's good offices to get *my* equipment back. Doesn't Bannister know what will happen if we let them catch us on those open plains?"

"Howie Bannister knows his way 'round a conspiracy better'n he does a battlefield, General," Black observed. "We give him the Secretary of War title 'cause we thought he'd drive a hard bargain with you, but he's not much on battles."

"I've noticed," Falkenberg said. He laid his hand on Glenda Ruth's arm and gently stroked it. It was the first time he'd ever touched her, and she sat very still. "This is supposed to be a party," Falkenberg laughed. He looked up and caught the mess president's eye. "Lieutenant, have Pipe Major give us a song!"

The room was instantly still. Glenda Ruth felt the warmth of Falkenberg's hand. The soft caress promised much more, and she was suddenly glad, but there was a stab of fear as well. He'd spoken so softly, yet all those people had stopped their drinking, the drums ceased, the pipes, everything, at his one careless nod. Power like that was frightening.

The burly Pipe Major selected a young tenor. One pipe and a snare drum played as he began to sing: *"Oh Hae ye nae heard o' the false Sakeld, Hae ye nae heard o' the keen Lord Scroop? For he ha' ta'en the Kinmont Willie, to Haribee for to hang him up . . ."*

"John, please listen," she pleaded.

"They hae ta'en the news to the Bold Bacleugh . . ."

"John, really."

"Perhaps you should listen," he said gently. He raised his glass as the young voice rose and the tempo gathered.

"Oh is my basnet a widow's curch,

or my lance the wand o' the willow tree? And is my hand a lady's lily hand, that this English lord should lightly me?"

After the song John forbade talk of politics. They spent the rest of the evening enjoying the party. Both the Friedlanders and Falkenberg's mercenary officers were educated men, and it was very pleasant for Glenda Ruth to have a roomful of warriors competing to please her. They taught her the wild dances of a dozen cultures, and she drank far too much; but all during the party, and even in Falkenberg's quarters later, the old border ballad haunted her.

When she left Falkenberg's room the next morning she knew she could never warn Bannister, but she had to do something. Finally she persuaded the president to meet John away from the shouting masses of the Council Chamber.

Bannister came directly to the point. "Colonel, we can't keep a large army in the field indefinitely. Miss Horton's Valley ranchers may be willing to pay these taxes, but most of our people won't."

"Just what did you expect when you began this?" Falkenberg asked.

"A long war," Bannister admitted. "But your initial successes raised hopes, and we got a lot of supporters we hadn't expected. They demand an end."

"Fair-weather soldiers," Falkenberg said. "Common enough. Why did you let them gain so much influence in your Council?"

"Because there were a lot of them."

And they all support you for President, Glenda Ruth thought. *While my friends and I were out at the front, you were back here organizing the newcomers . . .*

"After all, this is a democratic government," Bannister said.

"And thus quite unable to accomplish anything that takes sustained effort." Falkenberg activated his desk top map. "Look. We have the plains ringed with troops. The irregulars can hold the passes and swamps practically forever. If there is a threatened breakthrough my Regiment stands as a mobile reserve to meet it. They can't get at us—but we can't risk battle in the open with them."

"So what can we do?" Bannister demanded. "Franklin is sure to send reinforcements. If we wait, we lose."

"I doubt that. They've no assault boats either—they can't land in any real force on our side of the line, and what good does it do to add to their force in the capital? Eventually we starve them out. Franklin itself must be hurt by the loss of corn shipments."

"A mercenary paradise," Bannister muttered. "A long war and no fighting—you must attack while we have troops! I tell you, our support is melting away."

Falkenberg had a vision of ar-

mies thrown against the Friedland armor. He made no answer.

"John, he may be right," Glenda Ruth said. "The Council is going to insist . . ." His look was impassive, and she felt she was losing his respect. But he had to understand, these were only civilians in arms, and they hadn't money to pay them properly, while all the time they were guarding the passes their ranches were going to ruin . . . was Howard Bannister right? Was this a mercenary paradise, and John Falkenberg wasn't even trying?

The vision she'd had that lonely night at the pass came unwanted again to her mind. She fought it with the memory of the party, and afterwards . . .

"Just what in hell are you waiting on, *Colonel* Falkenberg?" Bannister demanded.

Falkenberg said nothing, and Glenda Ruth wanted to cry.

X

The Council had not voted six days later. Glenda Ruth used every parliamentary trick her father had taught her during the meetings, and after they adjourned each day she hustled from delegate to delegate. She made promises she couldn't keep, exploited old friendships and made new ones, and every morning she was sure only that she could delay a little longer.

She wasn't sure herself why she did it. The war vote was linked to the reappointment of Silana as governor in Allansport, and she did know that the man was incompetent; but mostly, after the debates and political meetings, Falkenberg would come for her, or send a junior officer to escort her to his quarters—and she was glad to go. They seldom spoke of politics, or even talked much at all. It was enough to be with him—but when she left in the mornings, she was afraid again. He'd never promised her anything.

On the sixth night she joined him for a late supper. When the orderlies had taken the dinner cart she sat moodily at the table. "This is what you meant, isn't it?" she asked.

"About what?"

"That I'd have to betray either my friends or my command—but I don't even know if you're my friend. John, what am I going to do?"

Very gently he laid his hand against her cheek. "You're going to talk sense—and keep them from appointing Silana in Allansport."

"But what are we waiting for?"

He shrugged. "Would you rather it came to an open break? There'll be no stopping them if we lose this vote. The mob's demanding your arrest right now—and for the past three days Calvin has had the Headquarters Guard on full alert in case they're fool enough to try it."

She shuddered, but before she

could say more he lifted her gently to her feet and pressed her close to him. Once again her doubts vanished, but she knew they'd be back. Who was she betraying? And for what?

The crowd shouted before she could speak. "Mercenary's whore!" someone called. Her friends answered with more epithets, and it was five minutes before Bannister could restore order.

How long can I keep it up? At least another day or so, I suppose. Am I his whore? If I'm not, I don't know what I am. He's never told me. She carefully took papers from her briefcase, but there was another interruption. A messenger strode quickly, almost running, across the floor to hand a flimsy to Howard Bannister. The pudgy president glanced at it, then began to read more carefully.

The hall fell silent as everyone watched Bannister's face. The President showed a gamut of emotions, surprise, bewilderment, then carefully controlled rage. He read the message again and whispered to the messenger, who nodded. Bannister lifted the microphone.

"Councillors, I have—I suppose it would be simpler to read this to you:

"PROVISIONAL GOVERNMENT FREE STATES OF WASHINGTON FROM CDSN CRUISER INTREPID BREAK BREAK WE ARE IN RECEIPT OF DOCUMENTED COMPLAINT FROM CONFEDERATE GOVERNMENT THAT FREE STATES ARE IN VIOLATION OF LAWS OF WAR STOP THIS VESSEL ORDERED TO INVESTIGATE STOP LANDING BOAT ARRIVES ASTORIA SIXTEEN HUNDRED HOURS THIS DAY STOP PROVISIONAL GOVERNMENT MUST BE PREPARED TO DISPATCH ARMISTICE COMMISSION TO MEET WITH DELEGATES FROM CONFEDERACY AND CODOMINIUM INVESTIGATING OFFICERS IMMEDIATELY UPON ARRIVAL OF LANDING BOAT STOP COMMANDING OFFICERS ALL MERCENARY FORCES ORDERED TO BE PRESENT TO GIVE EVIDENCE STOP BREAK BREAK JOHN GRANT CAPTAIN CODOMINIUM SPACE NAVY BREAK MESSAGE ENDS"

There was a moment of hushed silence, then the gymnasium erupted in sound. "Investigate us!?"

"Goddam CD is—"

"Armistice hell!"

Falkenberg caught Glenda Ruth's eye. He gestured toward the outside and left the hall. She joined him minutes later. "I really ought to stay, John. We've got to decide what to do."

"What you decide has just become unimportant," Falkenberg said. "Your Council doesn't hold as many cards as it used to."

"John, what will they do?"

He shrugged. "Try to stop the war now that they're here. I suppose it never occurred to Silana that a complaint from the Franklin industrialists is more likely to get

CD attention than a similar squawk from a bunch of farmers . . ."

"You expected this! Was this what you were waiting for?"

"Something like this."

"You know more than you're saying! John, why won't you tell me? I know you don't love me, but haven't I a right to know?"

He stood at stiff attention in the bright reddish tinted sunlight for a long time. Finally he said, "Glenda Ruth, nothing's certain in politics and war. I once promised something to a girl, and I couldn't deliver it."

"But—"

"We've each command responsibilities—and each other. Will you believe me when I say I've tried to keep you from having to choose—and keep myself from the same choice? You'd better get ready. A CD Court of Inquiry isn't in the habit of waiting for people, and they're due in little more than an hour."

The Court was to be held aboard *Intrepid.* The four-hundred-meter bottle-shaped warship in orbit around New Washington was the only neutral territory available. When the Patriot delegates were piped aboard, the Marines in the landing dock gave Bannister the exact honors they'd given the Confederate governor general, then hustled the delegation through gray steel corridors to a petty officer's lounge reserved for them.

"Governor General Forrest of the Confederacy is already aboard, sir," the Marine sergeant escort told them. "Captain would like to see Colonel Falkenberg in his cabin in ten minutes."

Bannister looked around the small lounge. "I suppose it's bugged," he said. "Colonel, what happens now?"

Falkenberg noted the artificially friendly tone Bannister had adopted. "The captain and his advisers will hear each of us privately. If you want witnesses summoned, he'll take care of that. When the Court thinks the time proper, he'll bring both parties together. The CD usually tries to get everyone to agree rather than impose some kind of settlement."

"And if we can't agree?"

Falkenberg shrugged. "They might let you fight it out. They might order mercenaries off-planet and impose a blockade. They could even draw up their own settlement and order you to accept it."

"What happens if we just tell them to go away? What can they do?" Bannister demanded.

Falkenberg smiled tightly. "They can't conquer the planet because they haven't enough troops to occupy it—but there's not a lot else they can't do, Mr. President. There's enough power aboard this cruiser to make New Washington uninhabitable. You don't have either planetary defenses or a fleet to oppose it. I'd think a long time be-

fore I made Captain Grant angry—and on that score, I've been summoned to his cabin." Falkenberg saluted. There was no trace of mockery in the gesture, but Bannister grimaced as the soldier left the lounge.

Falkenberg was conducted past Marine sentries to the captain's cabin. John Grant, nephew of Grand Senator Martin Grant and son of the late chief of United States security services, was a tall thin officer with prematurely graying hair that made him look much older than his forty-five standard years. As Falkenberg entered Grant stood and greeted him with genuine warmth. "Good to see you again, John Christian." He extended his hand and looked at his visitor with pleasure. "You're keeping fit enough."

"So are you, Johnny." Falkenberg's smile was equally genuine.

Captain Grant brought his chair from behind the desk and placed it facing Falkenberg's. Unconsciously he dogged it into place. A steward brought brandy and glasses. The marine set up a collapsible table between them, then left.

"The Grand Admiral all right?" Falkenberg asked.

"He's hanging on," Grant said. He drew in a deep breath and let it out quickly. "Just barely, though. Despite everything Uncle Martin could do the budget's lower again this year—I can't stay here long,

John. Another patrol, and it's getting harder to cover these unauthorized missions in the log. Have you accomplished your job?"

"Yeah. Went quicker than I thought– I've spent the last hundred hours wishing we'd arranged to have you arrive sooner." He went to the screen controls on the cabin bulkhead.

"Got that complaint signaled by a merchantman as we came in–surprised hell out of me. Here, let me get that, the code's a bit tricky." Grant played with the controls until New Washington's inhabited areas showed on the screen.

"Right." Falkenberg spun dials to show the current military situation on the planet below. "Stalemate as it stands," he said. "But once you order all mercenaries offplanet, we won't have much trouble taking the capital area."

"Christ, John, I can't do anything as raw as that! If the Friedlanders go, you have to as well. Hell, you've accomplished the mission. The rebels may have a hell of a time taking the capital, but it won't matter who wins. Neither one of them's going to build a fleet for a while after this war. Good work."

Falkenberg nodded. "That was Grand Admiral Lermontov's plan. Neutralize this planet with minimum CD involvement and without destroying the industries. Something came up, though, Johnny, and I've decided to change it a bit. The Regiment's staying."

"But I–"

"Just hold on," Falkenberg said. He grinned broadly. "I'm not a mercenary under the definition in the Act. We've got a land grant, Johnny–you can leave us here as settlers, not mercenaries."

"Oh, come off it," Grant said. His voice showed irritation. "A land grant by a rebel government? Look, nobody's going to look *too* closely at what I do, but Franklin can buy *one* Grand Senator anyway–I can't risk it, John. Wish I could."

"What if the grant's confirmed by the local Loyalist government?" Falkenberg asked impishly.

"Well, then it'd be O.K.– how in hell did you manage *that*?" Grant was grinning again. "Have a drink and tell me about it." He poured for them. "Where do you fit in?"

Falkenberg looked up at Grant.

THE ANALYTICAL LABORATORY MARCH 1973

PLACE	TITLE	AUTHOR	POINTS
1.	The People of the Wind (Pt. 2)	*Poul Anderson*	1.72
2.	He Fell Into a Dark Hole	*Jerry Pournelle*	2.43
3.	Who Steals My Purse	*John Brunner*	2.68
4.	Death of God	*Herbie Brennan*	3.55
5.	Hard Workers Only	*Mark K. Roberts*	4.59

Slowly his expression changed to something like astonishment. "I've got a girl, Johnny. A soldier's girl, and I'm going to marry her. She's leader of most of the rebel army. There are a lot of politicians around who think they count for something, but–" he made a sharp gesture with his right hand.

"Marry the queen and become king, uh?"

"She's more like a princess. Anyway, the Loyalists aren't going to surrender to the rebels without a fight. That complaint they sent was quite genuine. There's no rebel the Loyalists will trust, not even Glenda Ruth."

Grant nodded. "Enter the soldier who enforced the Laws of War. He's married to the princess and commands the only army around–what's your real stake here, John Christian?"

Falkenberg shrugged. "Maybe the princess won't leave the kingdom. Anyway. Lermontov's trying to keep the balance of power. God knows, somebody's got to. Fine. The Grand Admiral looks ahead ten years–but I'm not sure the CoDominium's going to *last* ten years, Johnny."

Grant slowly nodded agreement. His voice fell and took on a note of awe. "Neither am I. It's worse just in the last few weeks–one thing, the Grand Senators are trying to hold it together, John. They've given up the Russki-American fights to stand together against their own governments. Some of them, anyway."

"Can they do it?"

"I wish I knew." Grant shook his head in bewilderment. "I always thought the CoDominium was the one stable thing on old Earth," he said wonderingly. "Now it's all we can do to hold it together–the nationalists keep winning, John, and nobody knows how to stop them." He drained his glass. "The old man will be sorry to lose you."

Falkenberg nodded agreement. "But there's worse places to be–do me a favor, Johnny. When you get back to Luna Base, ask the admiral to see that all copies of that New Washington mineral survey are destroyed, will you? I'd hate for somebody to learn there really is something here worth grabbing. If things break up around Earth we won't have any fleet protection at all. On the other hand, if you need a safe base some day, we'll be here. Tell the old man that too."

"Sure." Grant gave Falkenberg a twisted grin. "King John First–what kind of government will you set up, anyway?"

"Hadn't thought. Myths change, maybe we're ready for monarchy again. We'll think of something."

"Yeah." Grant filled their glasses again and stood. "One last, eh? To the CoDominium."

They drank the toast while below them New Washington turned, and a hundred parsecs away Earth armed for her last battle. ■

THE WHIMPER EFFECT

When a dam bursts, the effects are immediate, obvious and catastrophic. But when a dam develops a slow leak, nobody might notice, even though the long-term effect might be equally disastrous!

J. R. PIERCE

LEO SUMMERS

A strange assortment of people read science fiction. There are not all that many, but they are everywhere. SF is a sort of Esperanto of literature. It is a small but sparse cult scattered all over the world, in high places as well as low. A science fiction writer who has been published widely has acquaintances everywhere, some of whom he has met and more whom he will meet as he passes by. The Whimper Effect took me to many places. Or rather, I took the Whimper Effect to many places, some of them odd indeed.

My story of the Whimper Effect starts in the Soviet Union. I had resisted going there for many years. Friends who returned thence invariably recited their disappointments and troubles with food, accommodations, shoddy goods and interminably frustrating bureaucracy. They always followed the dismal catalogue with the words, "You really should go there." I had never seen why.

But I was flattered when, over a period of years, Gyorgi Alexandrovich Kolganin had translated several of my novels. He wrote me first for permission, explaining that royalties would accumulate in the Soviet Union but must be spent there, and he sent me several of his SF stories. The indecipherable Cyrillic characters which stood between me and his stories intrigued me so much that I learned to read Russian after a fashion, and I translated several of his short stories into English. The personal style, the Russian allusions, the native turns of thought escaped me completely, but, you can't put such things into another language of another culture anyway. The science fiction came through. It was good, straight stuff, with current ideas, strong story lines and adequate characters whose individualities didn't get in the way of the plot or the message. I felt that I had found a like mind in a far land, and I began to think differently about visiting the Soviet Union.

Most SF writers are as poor as church mice. By some happy circumstance, I've escaped this. I don't know much science (I was a history major), but I do have a sense of the topical. I know a great many scientists, and talking to them has given me some idea of what is about to be important, or interesting, or startling just a little before TV, the newspapers and the magazines have caught up with it. Thus, when I was young I wrote about robots and cybernetics and space before and during the greatest excitement about these themes, and I dropped them as newer things came along. This has worked for me even in small matters. I got out a novelette about polywater just before it became apparent that this seemingly intriguing substance was a practical joke that eager and careless physical chemists had played on themselves.

Because the movies and TV have picked up several of my topical stories, and because I've always been willing to do literary or journalistic chores, especially when these involve traveling, I've made out pretty well. Still, I'm careful. I prefer interesting company to high living, and I try to travel profitably as well as for pleasure. So, I had my royalties and the possibility of fresh story ideas in mind when I arranged to go to the Soviet Union.

I won't dwell on the trip or on the commonplaces of Moscow. St. Basil's is wonderful and gaudy in a way beyond anything else. Red Square and the subways *are* impressive. Hotels and stores are depressing. One can scarcely believe the bureaucracy of hundreds of women with their hand-written lists and ledgers, even while one watches it. None of these has to do with the Whimper Effect. I came upon that in quite different surroundings and circumstances.

From my hotel I called the number that my SF colleague and translator had given me. I was answered in Russian, of course. I had already found that my limited reading knowledge of the language simply did not talk. I repeated firmly and persistently the name of Gyorgi Alexandrovich Kolganin, interspersed with "I am an American." Finally a heavily accented voice asked in English what I wanted. I gave my name and said that Gyorgi Alexandrovich Kolganin had asked me to call him when I was in Moscow.

"Oh, John, John," the voice said. "Welcome to Moscow, my colleague. When can you come to see me? We will collect your royalties."

When I asked where I should come, he gave me the name and address of the Lebedev Institute and spelled it out in Cyrillic, which proved to be no mean feat over the telephone. The conversation concluded, I approached a taxi with my dubious piece of paper. Happily, it worked, and after a wild and confusing drive I was deposited before a building of considerable size. I entered and gave Gyorgi Alexandrovich's name. Following a telephone call, my translator, colleague—and friend—appeared. He proved to be a beaming, burly man in his forties, warmer than anything I could have imagined in any other country. Off we went to his office and his colleagues.

When people question me about the Lebedev Institute I try to give reasonable answers, but they aren't much help. The whole place looked as if it had seen better days, but I have concluded that Russian buildings are built that way. The laboratories were full of what appeared to be scientific equipment, and it must have been. Gyorgi and his colleagues tried to explain their work to me, but I'm not really very knowledgeable about science. I

confined myself to maintaining a bright expression, nodding and stifling my yawns.

One thing I did learn was that Gyorgi had considerable status in the Institute. His office was large as well as stuffy, and there were two telephones on his desk. He was obviously respected by his colleagues. I concluded that he must be either a good scientist, or a political wheel, or both. I later learned that he was a corresponding member of the Academy of Sciences, which is, I guess, pretty good in the Soviet Union. How he found time to write science fiction I don't know, and it was even stranger that he had translated my novels. I suppose that he read through them, dictating a simultaneous translation to a secretary.

We spent a pleasant afternoon talking, and at the end Gyorgi and a number of men and women whom I had met insisted on taking me out to dinner, which was alcoholic, heavy and convivial. They all read English and spoke a version of it badly, but good intentions, my scant but growing ability to speak Russian and a general feeling of comradeship triumphed over all linguistic deficiencies. At the end of the dinner, Gyorgi told me, "We are going to a party," and we all swept off.

The Lebedev Institute has an indirect connection with my learning about the Whimper Effect. Gyorgi found me a cubbyhole where I could write during those mornings and afternoons when I wasn't out sightseeing with my Intourist guide. I came to make it the afternoons, for it was the parties that mattered. Almost every day, at the end of work, I was swept off by some group to some apartment, small and dingy or occasionally large and dingy, where everyone ate cold food, drank, listened to the phonograph and talked incessantly. In one large apartment, a composer of whom even I had heard played the piano between floods of talk.

During these evenings I met musicians, artists and writers, but it was clear that scientists were the elite. An artist's wife gained stature and glamor through an affair with a scientist. I was of interest because I wrote SF, and because I was Gyorgi's friend and had translated his stories.

Most of the partying Russians could drink endlessly with no effect beyond prolonged high spirits or sentimental sadness. I learned the hard way to stay within my capacity, even in the face of continual encouragement. But occasionally I met someone who was neither gay nor sentimentally sad. One evening a small, dark, morose man, three-quarters drunk, got me into a dark corner of a larger than usual apartment and proceeded to force upon me two things that I didn't want—vodka and ideas for science fiction stories. I didn't need any more of

the one, and the other is almost always no good.

This went on too long before I finally latched onto the fact that as the dark man's tongue became thicker and his English less certain, he was turning to some actual science that he thought I could make into a story.

"You don't know how microwaves change people," he said, "but we are finding out." Or, that's an English equivalent of his words.

This sounded like something good, and I led him on as best I could, enlisting the vodka bottle and miscellaneous toasts when he faltered. As nearly as I could make out, too much microwave energy did more than make the lenses of your eyes opaque. Over a long time, a great deal less microwaves had a profound effect on behavior, or temperament, or character.

"Look at me," he said. "Me. Once I was happy. Now look at me," and he took a drink on his own.

He told me that this effect was uncertain, and hard to evaluate because it was so slow. No one had found a physiological correlate. It affected some people differently, or even oppositely. "We had a black man from Africa in my Institute," he said. "He became frenzied, but off and on. Me, just depressed. What is it your poet Eliot says? 'Not with a bang, but a whimper'?"

But at that point the party went into some sort of convulsion and I was carried off to another apartment. A few days later, my royalties collected and nothing in the stores worth buying, I was off for a seaside vacation in the Crimea. I spent this pleasantly enough finishing the novel I was working on and doing other enjoyable things. Then I was on my way home, my faint urge to see the Soviet Union satisfied forever.

Once home, the Whimper Effect came repeatedly to my mind. I couldn't recall the name of the dark, morose man who had told me about it. I hadn't pried while I was in Moscow, for fear of getting an indiscreet drinker into trouble. I later realized that I couldn't even give a very good description of the man. But, as occasion offered, I tried to find out if there was anything in what he had said.

The first opportunity occurred shortly after I returned. When I encountered a long-time acquaintance and fan in Washington and told him that I had been to the Soviet Union and had met Gyorgi, he asked me if I'd mind dropping around and talking my visit over. Of course I agreed. He gave me the address, toward the west side of the city, and named an hour.

The small, old building I went to was still identified as belonging to the Navy, but it became clear that some other organization was in possession. There was nothing ostentatious. I merely gave my name and that of my acquaintance to the

girl at the desk. I signed the book and was given a badge. My acquaintance came, picked me up and took me to his office, where he introduced me to two colleagues.

The questioning that followed was polite but very persistent. The trouble was that I didn't know anything about what these men were interested in, which was cybernetics. I hadn't visited the Institute for Automation and Control. If Gyorgi and his colleagues had anything to do with cybernetics, I didn't know about it.

At the end of a half hour I was given up as a non-source of information. It was then that I asked about the Whimper Effect. I recounted the whole conversation. My acquaintance and his colleagues listened with a show of politeness. His only comment was, "Thanks. I'm afraid we can't tell you anything about that." But I was certain that he just wasn't interested. I felt obstinately that they *should* be interested. But, what could I do?

I didn't have any luck with my next chance, either. Of course, I inquired casually here and there, in what I was sure were the wrong places. But about a year later I met an old friend at a party, and he turned out to be the Deputy Director of the Office of Science and Technology. He had been in Washington about a year and was full of amusement and exasperation concerning things that were still fresh to him.

"By the way," he said as we were about to part, "I think that my boss would like to meet you. He's something of a science fiction fan."

The next morning I got a call. I was indeed free for lunch. So, a little before noon I walked up the long stairs of that gray, many-tiered wedding-cake building just west of the White House. I identified myself to the guard at the desk inside the door. He found my name on the list. This time there was no badge, only directions to go up the stairs on the left and then back to the office at the far end of the corridor.

I had never been in the Executive Offices before. In this day of austerity and glass, the interior seemed rather grand. I admired the broad staircase, the high, wide halls, the heavy wood doors with ornate insignia on the solid brass knobs and the elaborate decorated frames and arches over the doors. (I later found that these were of cast iron, of all things!) So, I found myself in the huge office of the President's Science Adviser. The grand effect of his office was marred only by the metal electrical conduits fastened to the impenetrable plastered brick walls.

Dr. Blank was surprisingly young and energetic, and very cordial. He took me down the stairs and across the alley into the staff entrance of the White House. There we passed one very nice dining room ("White

House Mess" is the right term, I found) and into an even nicer room, where we had a good lunch while I answered questions about SF. But I wasn't going to be put off about the Whimper Effect, and I told Dr. Blank all about my encounter in Moscow, and my experience when I had tried to tell about it a year ago.

"I wonder if there's anything in it?" he commented. "The Soviet Union's standards on allowed microwave radiation *are* a lot lower than ours. But those people you talked to were off on a cybernetics threat when you saw them. They wouldn't have been interested in anything else. I'll put you in touch with someone who might know."

Sure enough, next morning I got a call from someone who would be glad to see me immediately. So I took a taxi to the Pentagon, where there are no guards at all, and having got lost several times and inquired anew from anyone who was passing by in the halls, I finally reached my man. He had an office near to a door marked Deputy Director Defense Research and Engineering and I think that he was the Deputy's aid. Anyhow, he listened to me most politely and took numerous notes. When I shook his hand on leaving I got the impression that, having done his duty, he was about to put the whole matter from his mind, and I'm sure that he did.

I pretty much put the Whimper Effect from my mind, too. Then, in San Diego a couple of years later I was invited to visit a Naval laboratory thereabouts. I'm always game when a friendly fan asks me. I was intrigued when I found that the laboratory had both experimental psychologists and physiologists and microwave engineers as well.

During my visit I had an opportunity to tell my whole Whimper Effect story to a pleasant young SF fan who was also a physiologist. For once I had an attentive listener. When I was through, the young physiologist looked thoughtful for several minutes and then came to a decision.

"I suppose I shouldn't tell you," he said. "The fact is, we've been looking into something of the sort."

"Is it classified?" I asked. "I don't want to get you into trouble."

"No, not exactly," he told me. "Actually, it's been in the open literature. Your dark, morose friend was S. E. Primakof. He put out one short note on the effect. There hasn't been another word. He committed suicide a couple of years ago, by the way. Most people have thought that his paper was nonsense. I've had a look at it with animals, and I think I have positive results. If anything does occur, it certainly occurs at a very low level of radiation, and at a very particular frequency. But, it takes a very long exposure, too, and the effect is extremely erratic. Sometimes leth-

argy. Sometimes alternate excitement and lethargy. I've tried cats and mice, and the effect, if there is one, is species dependent."

I was overwhelmed. I realized that the Whimper Effect *had* been a good idea for a story. Maybe that was what had been haunting me. But then again, maybe it was something else.

"How long will it be before you make sure?" I asked.

"A long time, I'm afraid," he said. "I'm sort of bootlegging the work. I really can't ask for support on the basis of what I have. The lab director would think I was crazy."

"But this might be important," I told him, with perhaps a little too much excitement.

"How?" he asked, idly, I thought.

"Well," I said, "suppose the Russians really made it work?"

He looked as if he expected to hear more. I thought a moment.

"They might aim microwaves at our embassy in Moscow. They could do that, couldn't they?"

The physiologist laughed.

"That would serve those striped-pants boys right, wouldn't it?" he commented.

I could see that he didn't take me seriously.

"What about satellites?" I asked. "They're sending them up regularly now. And my friends tell me that we don't know what a lot of them are for."

"The level of exposure is low, but it can't be *that* low," he pronounced.

"Do you know that much about Soviet satellites?" I asked.

That was a mistake.

"Do you know that much about science?" he asked me in return.

I managed to laugh, and that was the right thing to do, but I was nettled. Nonetheless, I let the Whimper Effect lie for another couple of years.

Last week I visited my friend J. J. Coupling at the Bell Laboratories. He writes some SF and has always been a fan. At the end of the day, after I had had my fill of lasers and talking computers, I told him my whole story of the Whimper Effect. He listened attentively, like the SF connoisseur that he is.

"Well?" I asked.

"Well," he said, "suppose it *is* true. What would people do?"

"That's what I'm asking you," I told him.

"For one thing, it would be very hard to verify," he said. "Psychology and physiology are a lot more difficult than physics."

"If that deterred psychologists and physiologists, there wouldn't be any," I said.

"No," he replied. "But they tend to play it safe, to do what others are doing."

There was a thoughtful silence. Then he continued.

"There's another thing," he told me. "The fellow who told you

about this said that it affected a visiting African differently from the way it affected Russians."

"Well?" I asked.

"That labels it as racism," he said. "Psychologists in particular shy away from anything connected with race. Chinese, or Indians, or Negroes can't be thought of as more or less muscular, or musical, or intelligent, or susceptible to microwave radiation than white Anglo-Saxon Protestants."

"Why not?" I asked.

"That would be racism," J. J. asserted with a long face.

We both laughed. But I got the point. No psychologist was likely to spend his time studying an effect that was both uncertain and professionally dangerous.

"What can I do about the Whimper Effect?" I asked.

"I don't know," he told me.

"Aren't you interested?" I asked.

"Sure," he said, "but I've got enough troubles of my own."

Everyone does. But the Whimper Effect continues to bother me. It's years since that disturbed, morose and drunk man who must have been S. E. Primakof told me about the Whimper Effect in a Moscow apartment. Not long after that, he committed suicide.

At that time, my country was a cheery place, full of enthusiasms. We feared the Russians a little, but we were excited about the challenges of science, and particularly about the challenges of space. And what has happened? There has been a gradual change to apathy, discontent and despair, punctuated first by frenzied riots and later by somewhat less violent student demonstrations.

I know that this sounds like science fiction. But, suppose that the Whimper Effect *is* real? Suppose that the Soviet scientists have got the effect under control, or partially under control? Suppose that they are beaming radiations of the proper frequencies weakly but persistently over our nation, and perhaps over Europe as well? Suppose that the Communists *are* bringing our world to its end, not with a bang but a whimper? ■

the reference library

P. Schuyler Miller

HOWL

Is this the way the world will die . . . not with a shout of defiance, but with a howl? Of fear. Of pain. Of despair. Of misery. Of madness.

It is the way America goes in John Brunner's "The Sheep Look Up" (Harper & Row, 461 pp., $6.95). The book is not, as the publisher seems to think, a sequel to his "Stand on Zanzibar." It is, though, another outstanding example of "relevant" science fiction. Where "Zanzibar" extrapolated the effects of the population explosion on American society, "The Sheep Look Up" shows us the cumulative destruction of the environment.

The title is from Milton's "Lycidas":

> "The hungry sheep look up, and are not fed,
> But swoln with wind, and the rank mist they draw,
> Rot inwardly, and foul contagion spread."

It wraps up the theme, the setting, and the plot of the book.

Like "Zanzibar," the book uses the "new" cross-cutting techniques drawn from innovative films, but for some reason not as effectively. The author cuts back and forth from one set of characters to another, in brief bursts of plot and characterization, interspersed with vignettes, quotations, conversations, news flashes. None of it is form for form's sake, as it is with some writers: it works, it gives readers a far more effective perspective on a theme that requires it than following the thoughts and actions of one person, or one person and his immediate circle of contacts. (What it amounts to, is that a good writer can make any technique work. A poor one can be overwhelmed by his own tricks. A really superior one finds the technique that best fits his theme and plot.)

There is, for example, a mystery in "The Sheep Look Up." Brunner has written formal mysteries (though I haven't read any of them yet), and he shows you exactly what is happening, through the testimony of a variety of witnesses. Survivors of an African war suddenly go berserk and destroy the Europeans who are bringing them food and medical aid. Third World radicals insist they have been poisoned in a genocide plot. Individuals, seemingly unconnected, suddenly run wild. Neighborhoods go . . . whole cities. Eventually all the loose ends are tied together, and you learn what happened and why.

You also learn that what happened is only one small facet of mankind's destruction of the environment. The Mediterranean has become a cesspool; the Baltic is becoming one; and the people who have lived for thousands of years along their shores are recoiling into the interior of Europe and Africa. In the United States, where most of the story takes place, food . . . wa-

ter . . . air . . . soil . . . are hopelessly contaminated, as is human society.

We see all this over the shoulders of several individuals and groups of individuals, most of whom impinge in some way on the central mystery. Philip Mason, Denver area manager for a big insurance company, recklessly attending a corporate conference in Los Angeles. Austin Train, quiet, determined prophet of ecology who cannot separate himself from the outrages that less stable enthusiasts perpetrate in his name. Jacob Bamberley, owner of the world's largest synthetic food factory, the Lord Bountiful whose nutritious yeast and algae have driven hundreds of Africans mad. Nurse Lucy Ramage, who changes from an angel of mercy to a sword of vengeance. Doug McNeil, a doctor who still makes house calls. Michael Advowson, Irishman lost in the American jungle. Peg Mankiewicz, who doesn't care for dirty rain. And more. And more.

This is a book that I think will repay rereading. You will find things in it the second time, and the third and fourth, that you missed at first. It should be required reading in the science-fiction courses in hundreds of colleges (it may be a little outspoken for some high schools). It may not get an award this year, because it is up against some simpler and equally well written novels—James Gunn's "The Listeners," for example, and John Boyd's "The I.Q. Merchant." It will certainly be a finalist.

And it'll make you want to howl.

THE I.Q. MERCHANT

by John Boyd • Weybright and Talley, New York • 1972 • 218 pp • $5.95

This may very well be the best science-fiction novel of 1972, but the people who vote on such things may not read it before they do their voting. Actually, it has a chance at the 1973 Nebula Award, because the Science Fiction Writers' "year" ends November 30. The fans, though, may very well not know it exists when they vote on the "Hugo" awards.

"The I.Q. Merchant" is the seventh extraordinary SF novel—no two alike, none like anything else you've read—that "John Boyd" has had published since 1968. In a very general way, you could say it is like Daniel Keyes' "Flowers for Algernon" ("Charlie" on TV and in the films). It is the story of a retarded boy whose intelligence is increased by a drug—but there the similarity ends.

In this book the protagonist is the boy's father, a pharmaceutical manufacturer who takes the inexcusable step of making his son a laboratory animal. The drug he uses seems to increase the intelligence of mice and hamsters by several orders of magnitude—or kill them with runaway brain tumors. But Dorsey Clayton, on the verge of bankruptcy, on the edge of a hopeless break with his alcoholic wife, does take the step, and teenage Marlon swiftly changes into *Homo superior.*

What the change, and the way it occurs, does to Clayton and to his wife is the story. Not the story

you'll expect, either, because the author has an ace up his sleeve, but he doesn't need it. Theodore Sturgeon—in his commentary in "Nebula Award Stories Seven"—says, "Fiction is people." This book proves him right.

THE SCIENCE FICTION HALL OF FAME: VOLUME TWO

edited by Ben Bova • Doubleday & Co., Garden City, N.Y. • 1973 • 2 Vols. • 466 + xi pp.; 486 + xi pp. • $9.95 each

In this massive two-volume anthology you have nearly a thousand pages of the best middle-length science fiction of all time. The stories, longer than those in the first "Hall of Fame" anthology, are the selection of members of the Science Fiction Writers of America. As our own Ben Bova explains in his brief introduction, they came up with a list of seventy-six stories—too many even for a Harlan Ellison anthology, since these were all to be novellas of the length of Wells' "Time Machine," the oldest story in the book. The SFWA then tried to boil down to a short list of ten—and that was impractical too, quite apart from the fact that two stories, Walter M. Miller's "A Canticle for Leibowitz" (the original fragment of the book) and Ray Bradbury's "The Fireman" were not available. Doubleday's editor, Larry Ashmead—a friend of all SF writers and readers—came to the rescue by authorizing this giant two-volume anthology.

There are twenty-two stories—eleven in each volume. Only three were published before 1940: "The Time Machine" in 1895, E.M. Forster's "The Machine Stops" in 1928, and John Campbell's "Who Goes There?" in 1938. There are six stories from the 1940's, ten from the 1950's, and three from the 1960's (the most recent is "Cordwainer Smith's" "Ballad of Lost C'mell" from 1962).

Twelve of the twenty-two stories first appeared here in Astounding; six are from *Galaxy*.

I could go through both volumes, listing the stories and commenting on them for the benefit of the younger generation among you, to whom 1962 is long ago, 1952 (three stories) an age, and 1942 (Lester del Rey's "Nerves") a generation. There isn't one of the twenty-two that doesn't merit the space I usually give to a really good book. See where that leads us? Make your library buy the set. Blackmail someone into giving it to you. Buy it for someone else, and read it first. Wait for the Science Fiction Book Club edition.

I've mentioned a few of the classics collected here. You will also find Theodore Sturgeon's "Baby Is Three," the original nucleus of his "More Than Human" and his best story. You have the original Astounding Science Fiction version of Jack Williamson's "With Folded Hands," not improved when it became the first half of "The Humanoids." You have Robert Heinlein's "Universe" ("By His Bootstraps" got into the finals, too, but the rules said one to an author). You have James Blish's "Earthman, Come Home" . . . Isaac Asimov's

"The Martian Way" . . . James Schmitz' "Witches of Karres" (again, the original version) . . . Wilmar Shiras' "In Hiding" . . . Algis Budrys' "Rogue Moon." And more; and many more. (My apologies to all the people whose stories I haven't mentioned.)

Award winners? I haven't looked them up. After all, being in this anthology *is* an award.

DARKOVER LANDFALL

by Marion Zimmer Bradley • DAW Books, New York • No. 36 • 160 pp. • 95¢

Marion Zimmer Bradley's stories about a very strange planet, "Darkover," have been appearing over a period of several years. Most of them have been Ace paperbacks. Joanne Burger published a list of seven books, supposedly all in the Darkover series, in her "SF Published in—" annuals, but she evidently got her information from someone else. At any rate, the paperbacks in the list aren't all Darkover stories (at least, aren't identified as such in the text, though a check-back may show that the places mentioned are on Darkover). They are all the color-and-action yarns that their author does exceedingly well and that I thoroughly enjoy.

In this book, we are taken back to the beginning of the series and told how a shipload of colonists, bound for another world, was wrecked on the strange world they later called "Darkover." One faction was for facing facts and digging in; the ship's officers refused to admit that they couldn't rebuild the ship and continue to their scheduled destination, as ordered back on Earth. (Sounds rather like the World War Two Japanese who have been turning up on Guam, in the Philippines, and elsewhere.)

Then they encounter what we've encountered in the other Darkover books—the "Ghost Wind." When the season and weather are just right, certain plants release a psychedelic pollen into the air. It drives some people permanently insane and violent, gives others hallucinations, makes many people telepathic. The ship is sabotaged; contact is made with two previously undiscovered intelligent races (one of which can interbreed with Earthmen); and the survivors are permanently committed to Darkover. The book ends: "Earth knew nothing of them for two thousand years."

If you don't like this kind of mixture of adventure and the fantastic, the book and the series aren't for you. (The stands are loaded with paperbacks that go so far into the occult that they are out-of-bounds here. Someone called 'em "sword and nonsense" books.) But if you like action, color, and generously applied detail—for example, the Gaelic customs and folksongs of colonists from the Hebrides—here they are. The "Zimmer" in the author's name originates in the same New Netherlands Dutch ancestry that produced "Rip Van Winkle" and "Legend of Sleepy Hollow," and she has lived in the Southwest. Who is better qualified to create the mythology of a new world?

brass tacks

We've received dozens of requests for further information on psionic devices and their manufacturers as a result of Joseph Goodavage's article, "Magic: Science of the Future?" in our December issue. Here is Goodavage's answer.

Dear Ben:

I'm sorry, but the address given in the bibliography of "Magic: Science of the Future?" for Physico-Clinical Company (under "New Concepts in Diagnosis and Treatment," by Dr. Albert Abrams) seems to be hopelessly out of date. I would suggest to interested readers that they contact the Electronic Medical Foundation, in San Francisco, at 2452 Van Ness Avenue.

Failing that, they can surely get some better response from Vincent Stuart Publishers, Ltd., 55 Welbeck Street, London W.1, England.

In response to the most-often-asked questions from readers about various aspects of the psionics article:

The address of The Advanced Sciences Research and Development Corporation (Mr. T. Galen Hieronymus, Director) is P.O. Box 23620, Fort Lauderdale, Florida 33307.

The address of the De la Warr Laboratories, Ltd. (Marjorie De la Warr, Managing Director) is Raleigh Park Road, Oxford, England.

Mike Matthews can be reached at New Jersey Electro-Harmonics, 15 West 26th Street, New York City (Phone: 212-683-5667).

The book "New Worlds Beyond the Atom" was written by Langston Day and published by Vincent Stuart Publishers, Ltd., 55 Welbeck Street, London W.1, England.

The following people are deceased: Dr. Morris K. Jessup, George De la Warr, John W. Campbell, and Ruth Drown.

I can't for the life of me understand why so many people had such trouble obtaining copies of the Hieronymus patent (#2482773) from the U. S. Patent Office. However, anyone who's interested in obtaining a copy of the British patent for the Hieronymus device can write to the British Patent Office, 25 South Hampton Building, W.C. 2, London, England. The patent number is 272023.

There's another good psionic device patented in France (#996585—"Chrestogene"). The inventor's name is Baton. Write to the French Patent Office, Service de la Propriete Industrielle & Institute Naçionale de la Propriete Industrielle, Paris 8, France.

I'm currently investigating a series of psionic devices patented in various countries around the world. As soon as I know more about these other patents I'll be glad to share whatever I've learned with Analog readers.

JOSEPH F. GOODAVAGE

Dear Ben:

I feel somewhat compelled to reply to your "Legalize Pot?" editorial (November 1972 issue).

Last election day the voters of California turned down (by a two-to-one majority) the decriminalization of marijuana.

Proposition Nineteen would have provided penalties for sale and public use, but no penalties for private use and growth.

This was strongly opposed by the Republican Governor, Ronald Reagan, and numerous police agencies, but supported by the State Bar Association and the Sheriff of San Francisco among others.

One of the problems of the backers of CMI (California Marijuana Initiative) was in achieving funds for publicity and the like, whereas the opponents were easily able to obtain funding.

One can draw a number of conclusions from this and other experiences:

1. It appears that a great deal of the opponents' funds were donated by those who would benefit the most by its defeat, that is, the dealers.

2. I have smoked marijuana numerous times (as do a number of prominent and nonprominent SF fans and writers) and have had no *lasting* side effects from it. True, I became rather dizzy, disoriented, and sleepy at times, but unlike a number of well-known tranquilizers whose side effects do not diminish for hours or even days, marijuana's effects diminish in two to four hours depending on dosage.

3. My emotional state of mind has a great effect on whether or not I get "high." If I am among friends and have a state of well-being, then I get high. Whereas, if I am depressed, the pot does not relieve the depression, *nor* does it heighten it. So, at least within my experience, Weil's findings bear fruit.

As for the matter of open debate on the issue, wasn't that decided by the findings and recommendations of the President's Commission?

A. George Senda
850 Bryant Street, Room 700
San Francisco, California

Your reactions to pot sound like my reactions to alcohol; however, neither one of us is able to judge our own reactions objectively. As for the findings and recommendations of the President's Commission, they are being largely ignored because they don't agree with the Administration's preconceived opinions on the subject.

Dear Mr. Bova:

Regarding signal-to-noise ratios on marijuana (November 1972 editorial): one bit of noise that gets into every debate over mind-blowing drugs is the old "Prohibition argument." Citing the Eighteenth Amendment experience, it argues that if a guy wants to dope himself it's his business and not the government's—and like all businesses the government has no business in, prohibition never works. *Q.E.D.*

I'm not supporting the marijuana ban, since I don't know how harmful it is. But the "Prohibition argument" has nothing to do with harm. As a matter of fact, the Eighteenth Amendment was aimed at a habit which every doctor will

admit does a great deal of harm. It is directly blamed for a significant fraction of deaths, and involved in a much larger number of deaths where it acts indirectly, such as automobile accidents. But the deaths are trivial compared to the wasted lives and ruined families and a thousand other costs, nor is the historical record any more favorable. Finally, the "Prohibition argument" applies just as strongly to drugs the evil effects of which are beyond debate, such as heroin.

I doubt those who employ the argument have considered its implications. At the present time the chemists are inventing roughly one new mind-blowing drug per year, and the rate is accelerating. On sheer probability, a certain proportion of these can be expected to prove as pernicious as heroin. With such habits accumulating faster and faster every century, no matter how benevolent you consider free-enterprise they may prove too much for the human race without some effective government control. And what assurance have we that heroin is the worst that is to be?

However, you can see the "Prohibition argument" has nothing to do with marijuana. The question it raises is not whether marijuana should be banned, but whether anything at all should be banned, including heroin and whatever worse turns up in the future. Which is to say, it is sheer noise and should be kept out of the marijuana debate.

ALFRED B. MASON, M.D.
9 Maple Avenue
Bellport, New York 11713

The point of the "Prohibition argument" is simply that prohibition does not solve the problem!

Dear Ben:

I am inclined to agree with your editorial in the November issue. Why not legalize pot? No worse than booze, on the scientific evidence so far.

Sociological side effects will, hopefully, disappear when the legalistic implications are removed. The only question that remains is related to the impression that the habitual user becomes, to a variable degree, passive—withdrawn—not-caring. This effect, if real, may or may not be reversible; I don't know, and doubt if anyone else does. There just hasn't been enough work done on the subject.

So we are somewhat in limbo on the subject of *Cannabis.* But on your next subject—Arthur Kantrowitz' advocation of a "court of law" for scientific questions—I have a few words to say . . .

I'm not sure that Dr. Kantrowitz is as familiar with the United States court proceedings as he should be. The phrase, *a court of law,* is very attractive; but (aside from theory) a court of law, in this country at least, is based on adversary proceedings.

Adversary proceedings . . . what does *that* mean? Simply this: each side presents the best case it can make, and does its absolute best to tear down the other side's case. All this includes suppressing unfavorable evidence; impugning the reputation (or eyesight) of opposing witnesses; finding every possible

flaw in the integrity, intelligence or morality of said witnesses; picking every possible nit in the opposing testimony.

The court of law is an excellent way of forcing the greatest possible contrast between opposing points of view.

But—a scientific procedure it is *not*!

So much for that. One other (final) thought, relating to your words: "History shows that Prohibition not only didn't stop Americans from drinking booze, it made organized crime a big business."

I wonder if the same principle might not apply to the current spate of anti-gun laws. All such laws, so far as I can see, tend to disarm the law-abiding citizen—while not affecting the criminal (who will simply ignore the law) in the least.

If guns are outlawed, there is sure to be a thriving black-market in weapons—and the underworld will be its chief customer. What do you think?

CHARLES H. CHANDLER
6 Walker Avenue
Gaithersburg, Maryland 20760

The purpose of a court of law is to arrive at a reasonably good approximation of truth, through the adversary process. Presumably the judge will not allow the proceedings to get too far out of hand, and the jury is intelligent enough to make its own decision. A Kantrowitz court of science would also work on the adversary system, with a judge to keep the mayhem down to a minimum. The jury would be the acknowledged leaders in the field or fields under question. It may not be perfect, but it beats the nonsystem we now have for deciding major scientific-political issues.

As for gun prohibition, there's a big difference between the desire to keep a gun, which is based on fear, and the desire to drink alcoholic beverages, which is based on pleasure.

Dear Sir:

When we came across the enclosed article from the Los Angeles *Times* today, we couldn't help recalling Ted Thomas' story, "The Swan Song of Dame Horse," which appeared in the June 1971 issue of Analog. Although Mr. Thomas' story dealt with the inability to *utilize* heroin within the system, and the newspaper article tells of a serum which stops the *craving* for heroin, both cause a change in the body which would result in the cessation of the use of the drug. We both felt this similarity to be outstanding!

MR. AND MRS. A. R. KOCSIS
6514 E. Wardlow Road
Long Beach, California 90808

The newspaper clipping that accompanied this letter quoted a White House spokesman who described a new drug he dubbed a "narcotics antagonist." It will cause immunity to heroin desire for twenty-four hours, he claimed. The drug is not yet named, does not produce a "high," is nonaddictive and "has no more side effects than aspirin." Good news, if true.

Dear Ben:

Your editorial, "Legalize Pot?"

(November 1972 issue), at the first full paragraph on page 178 pointed out that marijuana does not cause physical dependence, which is true. The implication is that physical dependence is the worst effect a user could suffer, which is wrong. This misunderstanding is one of the prime factors standing in the way of a solution to the drug problem. It is the psychological dependence that is so devastating, not the physical dependence.

Most physical dependence, such as that resulting from a long-standing heroin habit, can be cured without danger to the victim. And it is the psychological dependence that drags the user back to the habit and is responsible for the ultimate cure rate of substantially zero. The controversial methadone program is responsive to psychological dependence, not physical dependence.

I tried to make these points in my story, "The Swan Song of Dame Horse" (Analog, June 1971), but perhaps I did not make them loud enough. I hasten to add that not all physical dependence is readily cured. Deaths have occurred, even under expert treatment, in trying to cure a long-standing barbiturate habit.

Cocaine does not cause physical dependence in the usual sense, but the psychological dependence is one of the most powerful there is. So do not give a pat on the head to any narcotic or dangerous drug, including marijuana, simply because it does not cause physical dependence. Physical dependence is not the main problem. Psychological dependence is, and marijuana causes it.

TED THOMAS

Is it the narcotic that causes psychological dependence, or the total environment of the user?

Dear Mr. Bova:

In your November editorial, "Legalize Pot?", you abbreviated tetrahydrocannabinol as TCH. The correct abbreviation is THC (*t*etra*h*ydrocannabinol). You'll probably get many corrections on this from young Analog readers, familiar with the chemical for non-scientific reasons. My only complaint is that I'm interested in the subject, but after a mistake like the above, how can I trust the validity of your article?

K.N.

Philadelphia, Pennsylvania

I typed the abbreviation incorrectly and our proofreaders faithfully passed the abbreviation along, as typed. It is my error. But don't confuse my typing with the validity of the editorial, please!

Dear Ben:

I'd like to put in my two-bits' worth on the controversy over so-called organic foods!

There is one point which evidently all of those raising so much pure hell over "chemically" grown foods conveniently overlook; and that is that none of the higher plants can utilize organic material directly. The only types of vegetation that can do this are the various kinds of bacteria, protozoa and fungi. When these have finished with the "organic" material, that

material is right back where it started from—the simple elements, potassium, nitrogen and phosphorus. In fact, one of the main constituents of manure is nothing in the world but ammonia—which, by odd coincidence, is one of the main fertilizers used in so-called chemical farming. It is ammonia that gives manure and compost much of its "delicate aroma"!

There is no argument on the use of chemical sprays—especially those spread broadcast from aircraft. Used as carelessly as these are all too often used, they do irreparable damage to the environment—damage we can ill afford to allow to go on. These dusts and sprays are commonly broad-band killers: they kill insect "friend" and "foe" alike. Quite frequently an orchardist will "thank" the bees which have patiently pollinated his blossoms for him by spraying the trees while the blossoms are still open. Of course the object of this spraying is to kill the larvae of the coddling moth and other insects which damage the fruit. It also kills many hundreds of thousands of honeybees.

To this extent, the "organic" people have much going on their side. Still, when this reaches the point of insisting on only "organic" fertilizers, it reaches the point of just plain absurdity—since no plant can use organic material as such save only in the purely mechanical function of acting as a soil conditioner.

Another absurdity in this line is the current fad for "raw" and "organic" honey . . .

"Raw" honey is a real joke! No honey is really "cooked" any more than milk is cooked during processing. Honey as it comes from the extractor contains some foreign material—such as portions of dead bees, pollen grains, bits of wax and so on. All of these are really foreign materials just as truly as hairs and other foreign material are not a real part of the milk drawn from a cow. I haven't heard of any movement to prevent farmers from filtering their milk as soon as possible after it is drawn—or of keeping the animal heat in it!

Honey is heated to a temperature some twenty to forty degrees lower than that used to pasteurize milk in order to make it more fluid for filtering (to remove that debris mentioned before) and to make it easier to handle in bottling. Too, honey—almost all of it—has a tendency to granulate. This process is hastened (like any other crystalization process) by the presence of "seed" crystals in the honey. Heating dissolves these "seeds." Compared to almost any other food you could name, honey—all of it—reaches the ultimate consumer in the most nearly "natural" form. In this sense, ALL honey could rightly be labeled "organic."

DAVID A. KING
94 Beacon Avenue
Layton, Utah 84041
Or "chemical"!

Dear Mr. Bova:

I am writing mainly to find out if your readers know of, or have done, research on plant sensitivity, such as has been conducted by the

Backster Research Foundation (165 West 46th Street, New York City 10036). Cleve Backster is a polygraph expert who discovered in 1966 that the electrical properties of common house plants, as measured with the galvanic skin response (GSR) channel on his polygraph, seem to vary in accordance with events in their nearby environment, perhaps even to human emotions. "Green thumb" advocates will find this no news; Backster's work, however, is finding scientifically reproducible, and immediate—as opposed to long-term growth changes—correlations between GSR-type measurements and certain laboratory experimental conditions. Backster's work has been reported in the *International Journal of Parapsychology* (Winter 1968), *Electro-Technology* (April 1969), and *The Wall Street Journal* (February 2, 1972).

Backster said on a talk show a few months ago that he is not pushing any theories about plant consciousness. "We prefer the 'gee whiz' approach with skeptical scientists," he said. "We show them our results, and say something like, 'Gee whiz, what do you make of this?' " Then it is up to the skeptic to make constructive suggestions . . .

I have been experimenting for a few weeks myself, with a single-channel GSR machine that feeds out a chart showing changes of about 0.1 percent per centimeter in the external resistance of, in this case, a philodendron leaf (and other plants). I won't say yes or no to whether I've found evidence the plant is sensitive to emotions, but the results certainly suggest it. This is a difficult thing to tell; the tracings will change "spontaneously" for no apparent cause, and there's no way to determine easily what is a "normal" tracing. I've left the recorder going while I was out of the house, and have come back to find patterns as regular as a sine wave going full scale across the strip, changing gradually or abruptly into different patterns, chaotic jerkings, or just going dead for a while and starting up again.

Up to this point, I've not done any elaborate experiments. It is taking quite a while to find the patterns of "normal" behavior, compared with connections to other plants, or to inert objects like a (presumably unexcitable) carbon resistor as a control showing "flat" chart recordings. Different types of plants, as would be expected, give different types of readings. One particularly odd complication is that the surface of the leaf sometimes shows rectifying properties, which have no apparent geometric symmetry; for example, the resistance across the leaf can be 50 megohms in one direction, five in the other, and the chart tracings will be radically different for the two directions . . .

If anyone could trade—or would like more—information on this, please get in touch with me at the address below.

WILLIAM B. WEITZEL
255 Congress Street
Bradford, Pennsylvania 16701

Looks like you have a low signal-to-noise ratio—and it's not yet certain what the signal is!

continued from page 8

infant mortality rates remained high, this particular cultural trait favored the survival of Hindu culture, since it maximized the birth of Hindus under conditions that also maximized the early death of Hindus. But now, since modern techniques have caused a drastic drop in the infant mortality rate, there are far too many people in India for the available resources, thus making the same trait a threat to the survival of the Hindu culture.

Thus human culture has been as much a product of the process of natural selection as the human species. We are not merely clockwork oranges, the clockwork itself, the social programming which determines our "repertoires of behavior," how we respond to the world around us, is *itself* the product of a blind deterministic process.

And if that doesn't make you feel enough like a robot, Skinner is prepared to take it further, into the realm of value judgments, our inner feelings of what is right and wrong, what pleases us as moral beings and what outrages our sense of humanity.

"Good things are positive reinforcers. The food that tastes good reinforces us when we taste it. Things that feel good reinforce us when we feel them . . . a value judgment is not a matter of fact but of how someone feels about a fact . . . behavioral science . . . is a science of values."

Skinner seriously contends that he has created an exact science of value judgments that at one stroke replaces the philosophy of ethics, the moral values of religions, the existential human aesthetic of poets, and the logical systems of law. He believes that behavioral science may now solve all the moral paradoxes that have tortured and obsessed the human spirit since time began.

And what is this blinding insight into the essence of moral judgment?

"To make a value judgment by calling something good or bad is to classify it in terms of its reinforcing effects," says Skinner. "What's right is what you feel good after," said Ernest Hemingway, a bit more succinctly.

As human beings, we only know what makes us feel good and what makes us feel bad. In Skinner's terms, "value judgments" are merely statements about positive and negative reinforcements, patterns of punishment and reward. We say that murder is "bad" because our culture has developed punishments like "execution," "jail," or the more subtle "guilt feelings" which tend to make us feel bad if we commit murder. We say that love is "good" because our culture has evolved rewards like sexual affection and feelings of joy which are activated by giving or receiving love. According to Skinner, love makes us feel good and murder makes us feel bad because that's the way we've been conditioned. No absolutes of right or wrong are involved. Our very con-

cepts of "right" and "wrong" are simply charges of punishment and reward generated by feedback between our cultural programming and the stimuli of the environment. Theoretically, by changing the programming, you could produce individuals who loathe love and sincerely believe that murder is an absolute good. And if you look at human history (or even the daily newspaper) you can find this pretty hard to deny.

Skinner then proposes that we commandeer the blind evolutionary process which has made us whatever we are. An Elton John song says: "Take me to the pilot for control, take me to the pilot of the soul." Skinner declares that there was never anyone in the pilot's seat in the first place except blind evolutionary determinism, and that behavioral technology is now ready to turn off the automatic pilot and take over the controls of human destiny.

On the surface of it, this is a grand leap of the human spirit (a literary fiction according to Skinner, of course). Skinner, after relentlessly outlining the series of deterministic processes which have programmed man the species, man the social being, and man the self-conscious individual, after showing that free will and even morality do not exist, after presenting us with an image of man as a protoplasmic robot, then declares that we should use the tool of behavioral technology to so modify the contingencies of reinforcement which control us as to reprogram ourselves in our own ideal image.

There seems little doubt that behavioral technology has the tools to consciously reprogram a human culture. Consider the Skinner Box: an environment totally controlled by the experimenter, a pocket universe containing a single organism. Say the organism is a pigeon, and you want to condition it to peck at cards with circles on them. You present the bird with a series of cards showing circles, squares, and triangles. It pecks at the pictures at random. Each time its beak hits a card with a circle on it a pellet of food drops into the box. After a while, the bird will peck at a circle whenever it appears. It has been programmed to peck at circles through the use of positive reinforcement; it has acquired a repertoire of behavior dictated by the experimenter, and it probably feels that circles are "good."

Consider each human being as an organism in a Skinner Box; our Skinner Boxes are the total environment that surrounds us as we perceive it. We react in ways that are determined by the environment as presented to us by our senses and our repertoires of behavior as generated by our genetic inheritance and the contingencies of reinforcement programmed into us by our physical and social environment. To change the patterns of reward and punishment which make up a culture, therefore, is to reprogram the behavior of the individual, just as surely as the experimenter reprogrammed the behavior of the pigeon.

Once you understand this prin-

ciple, it really *is* relatively simple not only to get people to do what you want them to do, but to get them to want to do it and to feel that it is "good." Positive reinforcement is a much more powerful instrument of social control than any conceivable form of punishment because it makes the people being controlled feel happy, and, moreover, feel that they are acting of their own "free will."

If you want a powerful army, don't draft unwilling men, make the army an elite force in national affairs and men will flock to the colors. Latin American and African armies certainly don't have manpower or motivation problems.

If you want to solve an overpopulation problem, don't try to make people feel bad about having babies when this goes against the ingrained patterns of cultural reinforcement of centuries. India is trying this approach and failing.

But Japan has succeeded in stabilizing its population. Japan induced a lower birthrate by using sexual pleasure as a positive reinforcement. The powerful positive reinforcement quality of sexual pleasure had, of course, been one of the major causes of the problem before the development of effective contraception. Effective contraception and effective treatment of venereal disease removed the counterbalancing "punishments" of the natural environment: unwanted pregnancy and incurable venereal disease. But the conditioned cultural traits that encouraged large families remained. Instead of preaching against babies or encouraging sexual repression (always a losing battle in the end!), the Japanese Government legalized abortion and encouraged contraception. Moreover, it loosened the negative reinforcements against sexual pleasure by allowing pornography and sexual liberty to flourish, and further subtly encouraged a sexual aesthetic to develop in which fancy condoms became sexually titillating instead of a turn-off. Thus the full power of sexual pleasure as a reward was marshaled behind contraception.

The carrot is mightier than the stick.

And nobody bitches about it either.

In fact hardly anyone usually notices that it's being used.

So there's not much question about whether behavioral technology can actually reprogram a culture and through the culture the minds and behavior of its individual members. Behavioral technology is quite literally capable of brainwashing you with a smile.

But *should* behavioral technology consciously mold the culture and through it each individual consciousness, and if so, toward what end?

"Should" is not a word in B. F. Skinner's vocabulary.

"The designer of a culture is not an interloper or meddler . . . he is part of a natural process. The geneticist who changes the characteristics of a species by selective breeding or by changing genes . . . does so because his species has evolved to the point at which it has

been able to develop a science of genetics and a culture which induces its members to take the future of the species into account."

In other words, Skinner considers himself and his technology of behavior to be end products of the long chain of deterministic evolution which produced them. He claims to be consistent: when he contends that free will is an illusion, he doesn't exclude himself. To ask whether behavioral technology *should* take control of the reward and punishment patterns which are culture is futile: the capability has been evolved by the culture, along with the positive reinforcements to induce behaviorists to exercise that capability. From Skinner's point of view, telling him not to exercise the capability to mold culture is like telling an elephant not to use its prehensile trunk to pluck leaves from the tops of trees. He refers obliquely to men like himself as "those who have been induced by their culture to act to further its survival by design." He is as much a servant of the evolutionary process, acting out imperatives programmed into him, as that elephant exercising its ability to snatch tender buds with its evolutionarily-determined trunk. He flatly denies the validity of the very concept of responsibility.

We are out in the nether reaches of behaviorism now, and out here in the boonies the paradoxes in the system begin to nibble at its consistency. After all, Skinner has tried to encompass *everything;* small wonder he has bitten off a bit more than he can chew.

He gets even more unsteady when he comes to the question of how behavioral science should determine *what* changes to make in our cultural patterns. "Survival is the only value according to which a culture is eventually to be judged, and any practice that furthers survival has survival value by definition." Including behavioral technology.

For Skinner, the survival of the general cultural matrix which produced him is by definition the highest possible good because survival of the culture is the parameter along which natural selection programs cultural patterns, just as survival of the species is the parameter along which natural selection programs genetic processes. Choice of such a goal is an illusion. The goal chooses you.

But Skinner doesn't seem to comprehend how circular all this is. If the man and the technology which seek to reprogram human culture are themselves programmed by that culture itself, we're right back where we started from before behavioral technology: with blind evolutionary determinism in the pilot's seat. Skinner wouldn't be turning off the automatic pilot; he'd just be wiring himself into the circuit as another loop in the sequence whereby the deterministic universe produces its own inevitability.

Murkier and murkier. Skinner talks about countercontrol, the process whereby the people who control the reinforcement patterns of a culture are themselves controlled

by those same patterns, but he doesn't see the paradox in this, and he doesn't realize that it utterly destroys the premise of "scientific objectivity" upon which his whole structure is based. In effect, he has used "scientific objectivity" to prove that scientific objectivity is impossible!

The best he can do to defend the scientific objectivity with which he began his train of logic and which paradoxically ends up proving its own impossibility is to dredge up some shoddy goods from the narcissistic depths of technocracy:

"The scientist works under contingencies that minimize immediate personal reinforcers . . . [*Such as the publication of best-selling books?*] The published results of scientists are subject to rapid checks by others, and the scientist who allows himself to be swayed by consequences that are not part of his subject matter is likely to find himself in difficulties. To say that scientists are therefore more moral or ethical than other people . . . is to make the mistake of attributing to the scientist what is actually a feature of the environment in which he works."

In other words, it's not to our credit if we scientists just happen to be nobler and purer than anyone else, it's simply our inevitable destiny, is all. And the scientists who developed nerve gas were entirely objective, of course; they weren't under the influence of any social conditioning or cultural pressures. Here Skinner denies his own precepts when it comes to applying them to his own motives.

"Perhaps I must yield to God in point of seniority," Skinner's mouthpiece Frazier grudgingly admits in "Walden Two." "Though . . . I could claim a more *deliberate* control."

Thus has B. F. Skinner extended the consequences of his relatively simple experiments in animal behavior step by step into the root questions of human psychology, culture, evolution, morality, ethics, values, and even metaphysics.

Up to a point, it is a powerful analysis of what we are and how we got there, and it doesn't really start to crumble until it gets to the point of proposing action. Then, as we've seen, Skinner makes the usual mistake of would-be messiahs: he assumes incorrectly that he himself is somehow removed from the very processes he has described when it comes to "objectivity" while out of the other side of his mouth appealing to the evolutionary inevitability of his stance.

And when it comes to placing a value judgment on *what* behavioral technology should try to accomplish, he can only point lamely to survival of the culture as the goal programmed into the individual by cultural evolution. Therefore, behavioral technology should consciously alter the cultural patterns of reinforcement so as to produce individuals who better serve the interest of the survival of our cultural pattern: less individualistic, less self-motivated, more "other-centered." Of course, there have been plenty of salesmen for this particular bill of goods before. And that is

precisely why names like "neo-fascist," "authoritarian," and "thought-controller" tend to cling to B. F. Skinner.

One large flaw in all this is that Skinner has not faced the full implication of his own analysis. Namely that survival of the particular cultural pattern which produced us as the ultimate good is simply a great big all-pervasive reinforcement contingency programmed into us by our environment. The very existence of a science of behavior which explains this to us and of a science of behavior which gives us the tools to reprogram our cultural patterns means that we can reprogram this basic command too, if we so choose. Skinner does not see that he has given us a means whereby we can step entirely outside the process of evolutionary determinism.

Skinner's theory is so complex and convoluted that one easily loses sight of the fact that it is a huge and tortuous elaboration from the study of simple animal behavior; an attempt by Skinner to extend his own area of scientific competence to encompass all of human existence, rather than a grand synthesis drawing upon all relevant fields of knowledge. As such, it must simply ignore vast and powerful areas of other insights into the same general subject matter in order to retain its coherence. B. F. Skinner is an ambitious specialist, not a universal thinker or a synthesizing generalist in the manner of a Buckminster Fuller.

For one thing, Freud, Marx, and McLuhan have taught us that to understand a process which deterministically controls the human mind and behavior, one must view it from the outside, as a system. Once this is accomplished one is free of the determinism of the process because there now exists a system which contains the original process *plus an analysis of the process.* This creates a new and freer level of human consciousness. Once such a consciousness becomes part of the general culture, that culture is free from the previous deterministic restraints of that process, though certainly not from its continued influence.

Freud showed us that our "logical mind" was actually heavily controlled by unconscious processes of which we were unaware. But once we became conscious of the mechanisms of the unconscious, of how the unconscious mind affected us, we could take those mechanisms into account and thus free ourselves of the determinism of the unconscious mind, though of course not of its influence. This was a step in the evolution of human consciousness that a Skinner might trace to the inevitability of natural selection, but it was still a step toward increased freedom of choice, away from evolutionary determinism, and toward a higher order of self-consciousness in which the human mind learned to create a feedback with its own unconscious processes.

Karl Marx, a man whose "repertoire of behavior" was molded by a culture whose patterns of reward

and punishment created an economic structure *of which its members were largely unaware,* a structure which programmed class struggle into the system, nevertheless managed to construct a larger system which analyzed the evolution of the economic mechanisms at work in his culture, and thus gave Western civilization self-consciousness of the deterministic nature of its economic structure. But once Dialectical Materialism had described the deterministic process of class struggle and economic evolution, it became obsolete because it cracked open the closed system it described by the very act of describing it. Think of it as a kind of Uncertainty Principle: you can't describe and analyze a process that deterministically controls human thought and behavior without destroying the determinism of that process. That's why communism has never really worked: it assumes an economic determinism which the work of Marx himself destroyed!

And long before Skinner published "Beyond Freedom and Dignity," Marshall McLuhan had gone beyond one of its central insights and had come up with an opposite conclusion. Although McLuhan never quite stated it in so many words, his fundamental contribution to the evolution of human consciousness was the insight that the matrix of all consciousness is the sensorium.

What we experience as consciousness is the interaction between the biochemical and bioelectrical mechanisms of our brains and the universe of the senses as transmitted to the brain by our sensory organs. This total constellation of sensory impressions, the sensorium, *is* our universe, period. We experience the "outside world" entirely as it impinges on our sensory organs, and we can experience nothing else, obviously. Our minds are entirely enclosed by our sensoriums.

Artificial extensions of our senses, such as television, film, print, radio, radar, and so forth extend and expand our evolutionarily determined "natural" sensorium in space, time, the visual spectrum, et cetera, giving us direct sensory experience of distant places, past events, previously invisible areas of the electromagnetic spectrum, and other areas of the physical universe that were previously outside the subjective universes of our own sensoriums. By so doing, they alter both our perceptions and our behavior in a way that has nothing whatever to do with altering reinforcement contingencies as such.

By radically altering our sensoriums, television, for example, shattered all sorts of well-established cultural programming. War, for instance, was once a series of events perceived by most people through second-hand media like film and print which could be edited so as to condition the populace to associate military combat and human self-sacrifice with emotional rewards like glory, adulation, and fancy medals by the simple expedient of making this pattern of reinforcement a self-fulfilling prophecy. But with the Vietnam

War, television altered our sensoriums so that we perceived a real war in real time in all its stupidity, horror, boredom, and nastiness, thus smashing to pieces the link between military combat and the positive emotional reinforcements of medals and glory. Though the government continued to attempt to use these rewards as positive reinforcements to maintain public support for the war, these Skinnerian methods proved absolutely futile in the face of alteration of the sensorium.

If operant conditioning has caused a dog or a man to salivate at the sight of a blue circle, a simple pair of tinted glasses will alter his behavioral response to the same stimulus. The state of the sensorium is a far more basic determinant of behavior than cultural patterns of reward and punishment because we receive these very reinforcements themselves through the media of the senses. Alteration or expansion of the sensorium alters consciousness and behavior by altering the very subjective universe in which consciousness and behavior take place.

So far, this is a description of another deterministic process, sensory determinism. But McLuhan gave us a point from which to view this sensory determinism analytically, a system which includes the sensorium plus analysis of how the sensorium affects consciousness. By so doing, he altered the deterministic nature of the process, since human consciousness now had awareness of this controlling element of its own behavior and thought. Man's self-consciousness of himself as a product of his environment was raised to a new level of awareness, and freedom of choice increased.

Skinner's insights into the nature of culture and behavior form a similar liberation from a previously deterministic process, but one which he himself seems to have been unable to perceive. He has developed a powerful analysis of the ways in which individual human consciousness and behavior patterns and the cultural traits which condition them have evolved through an inevitable process indistinguishable from the natural selection which produced man the species, man the naked ape. And he has shown how this locks man into a process whose end-product was never of his own choosing in the first place, and which ties his very ultimate value judgments into the survival of the cultural matrix which produced him.

But he fails to realize that he too—like Freud, Marx, and McLuhan—has shattered the determinism of the process he was studying by the very act of studying it.

It apparently never occurred to Skinner to ask: is there any *human* reason we should *want* to retain survival of our inherited cultural pattern as the ultimate good, the maximum positive value programmed into us by evolution? Wouldn't it be more reasonable to say that our ultimate goal should be to promote the greatest happiness and development for the

greatest number of individual human beings possible? The survival of a culture and the greatest good for the individuals who make up that culture are *not* the same thing in all cases. Mankind, after all, has managed to produce some pretty hideous social carcinomas which nevertheless had evolved powerful cultural reinforcements to promote their own unfortunate survival.

The Nazis, for example, were imprisoned in a complex of social reinforcement that was damn good at promoting and maintaining the particular style of brain-freeze associated with their culture. They were entirely gung-ho for the survival and perpetuation of their culture to the point where they were perfectly willing to slaughter a few million people to insure it, and their culture was destroyed principally through the military ineptness of Adolf Hitler rather than by inherent evolutionary flaws.

The Aztecs evolved a national repertoire of behavior which included the powerful emotional reward of mystical ecstasy as a positive reinforcement for cutting out the hearts of massive numbers of human beings on stone altars and dedicating the rivers of blood thereby produced to the greater glory of the shackles on their own minds. Without the intervention of outside forces, they might very well be doing it still.

The Nazis didn't choose to be monsters; they evolved that way through blind evolutionary chance and acted out the ghastly part in which fate had cast them because they had no viewpoint outside their cultural pattern from which to study that pattern and thereby shatter its inevitability. The Aztecs didn't build pyramids of dead bodies as the highest expression of the glory of their culture because they enjoyed evil for its own sake, but because the pattern of contingencies of reinforcement that their culture evolved through a process of natural selection made them experience ritual slaughter as the source of powerful conditioned positive reinforcement, namely religious ecstasy.

According to Skinner, we cannot break the bonds of evolutionary determinism any more than the Nazis or Aztecs could, so our best course is to allow our culture to enlist our services in the glorious cause of its own survival. While it would be extreme to suggest that our basic cultural pattern is as worthy of extinction as that of the Nazis, it must be pointed out that the Nazis were utterly convinced that they were serving evolutionary destiny too. So much for survival of the culture that one is born into as the highest possible good!

Skinner has provided us with a viewpoint from which we may now act to shatter the mind-freezing, self-perpetuating cultural bonds which produce social cancers like Nazism, but, like Moses, his only glimpse of the land to which he has led us is from afar. One may then ask *why* Skinner has failed to grasp the ultimate implications of his own work.

It comes down, in large part, to a confusion of experimental assump-

tion with absolute reality. Skinner has proceeded from the assumption that one must study the human mind by studying the behavior it causes us to exhibit because behavior is the only aspect of the mind that can be studied objectively. This is a reasonable assumption to make for the sake of pragmatic methodology, but somewhere in the twisting coils of his theory, Skinner loses sight of the fact that this is *only* an experimental assumption. He ends up making the further, unstated and perhaps unconscious, assumption that nothing exists if he can't study it objectively. Since only behavior can be studied objectively, he assumes that every aspect of the human mind that cannot be explained as a function of behavior cannot exist. This is not only a logical flaw, it is demonstrably untrue in point of actual fact.

He must, for instance, ignore the sensorium, whose existence we all verify independently and separately at each instant of our lives, because he cannot measure it objectively. He must also ignore the fact that each human brain has a biochemical makeup that is as subtly unique as each set of human fingerprints, so that each human being is ultimately possessed of a unique consciousness based on the fine structure of his brain, and a consciousness, moreover, which varies from moment to moment due to the constant flux of its biochemical matrix, which is affected by everything from fatigue to sex to a head-cold.

If you don't think that biochemistry alters consciousness by altering the sensorium and the mechanisms which interpret it, try some LSD. As for behavioral changes, observe what hashish altering the biochemistry of the brain can make of long-established and ingrained cultural patterns of reinforcement and the behaviors they produce. As witness the well-known chemical conversion of admen to hippies.

The fact is that these areas of the mind which Skinner dismisses or attempts to explain away because he cannot study them—with elaborations of the methods used to study the behavior patterns of animals *which do not have the higher cerebral functions of men*—do exist whether he can measure them or not.

Each of us can prove to his own satisfaction that our mental patterns arise at least in partial independence from the "repertoire of behavior" programmed into us by our culture by taking a few good stiff drinks, or dropping some LSD, or running a high fever. The cultural matrix remains the same, but one perceives his environment differently, and reacts differently to stimuli because of this, and because the fine chemistry of the nonsensory areas of the brain is also altered.

Since a thousand minute factors minutely alter the biochemistry of our brains from moment to moment, our consciousness is never quite the same from moment to moment. Therefore "contingencies of reinforcement" cannot control us deterministically because *that which they are controlling* is in constant flux. And anyone that wants con-

clusive proof that altered brain chemistry alters behavior doesn't have to go any further than the local drunk tank.

There is even an infant medical specialty called psychopharmacology dedicated to understanding the specific biochemistry of specific mental states, and to ultimately tailoring styles of consciousness through altering the fine chemistry of the brain.

Just as geneticists will be altering the genetic coding at will in a few decades and thereby removing man from the determinism of natural selection on a biological level, so will sciences like psychopharmacology and behavioral technology free us from the determinism of natural selection on a mental and cultural level.

But for either psychopharmacology or behavioral technology to contend that it alone is the science of the human mind would be to deny the complexity of the actual reality and shackle us in another brain-freeze, either of allegiance to a specific artificial "optimum" brain biochemistry shoved down our throats like castor oil for "our own good" or by the adoption of a self-perpetuating set of reinforcement contingencies permanently programmed into a frozen culture by the powerful tools of behavioral technology.

To become aware of a controlling process is to transcend the determinism of that process. It is Skinner's achievement to have elucidated such a process. It is his failure to have failed to attain the new level of consciousness that his own work implies.

In the beginning, there was the chemical soup of the primeval ocean, simple molecules colliding with each other, reacting to form more complex molecules, motivated by nothing more than blind evolutionary selection of those molecules which were most stable under the given conditions of the moment. Ever more complex molecules evolved through this process, until one came into being that was capable of reordering its chemical environment so as to produce duplicates of itself. This was DNA, or the gene, or the virus, or simply *life.*

Natural selection continued to operate. Genes mutated to produce new biological traits, and those traits perpetuated themselves which increased the ability of their carriers to survive and duplicate themselves in the given environment. But physical environments alter, and when other species become important aspects of the physical environment it alters more rapidly, and adaptability to wider and wider ranges of environmental conditions becomes a survival factor and is therefore selected. Life moves out of the restrictions of the sea and spreads across the land, finally filling every conceivable ecological niche on the planet.

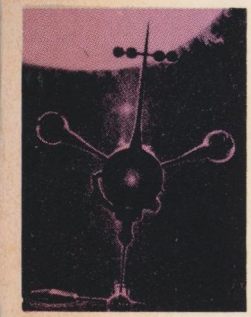
Finally a life form evolves through this process which has a new kind of trait: consciousness of the environment as environment, or in Skinnerian terms, possessed of a repertoire of behavior which causes

it to alter the environment so as to maximize its own survival. This is man, the first animal to have a feedback relationship with the physical environment. Man consciously alters the environment while it alters him which causes him to alter it, ad infinitum.

This produces the social environment—that part of man's total environment consisting of his fellow men and their works. Until very recently, as Skinner has so cogently shown, the evolution of the social environment was as subject to the blind force of natural selection as that of the evolution of man the species from the original chemical soup of the primal sea.

What Skinner has failed to comprehend is that at the very moment that he himself elucidated the process, this whole process of natural selection ceased to be deterministic, just as the insights of McLuhan and psychopharmacology have shattered the determinism of brain biochemistry and the sensorium. The blind process of natural selection *changed qualitatively* when it finally produced a means by which its highest product, man, could transcend the deterministic process which produced him.

This product is the autonomous man Skinner claims does not exist. Man, who can observe the series of deterministic processes which have produced him historically and which produce his consciousness from moment to moment, and by the very act of studying these processes convert them from linear causal relationships to feedback with his own consciousness, can transcend their determinism, and claim at last the pilot's seat of his own soul. ■



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