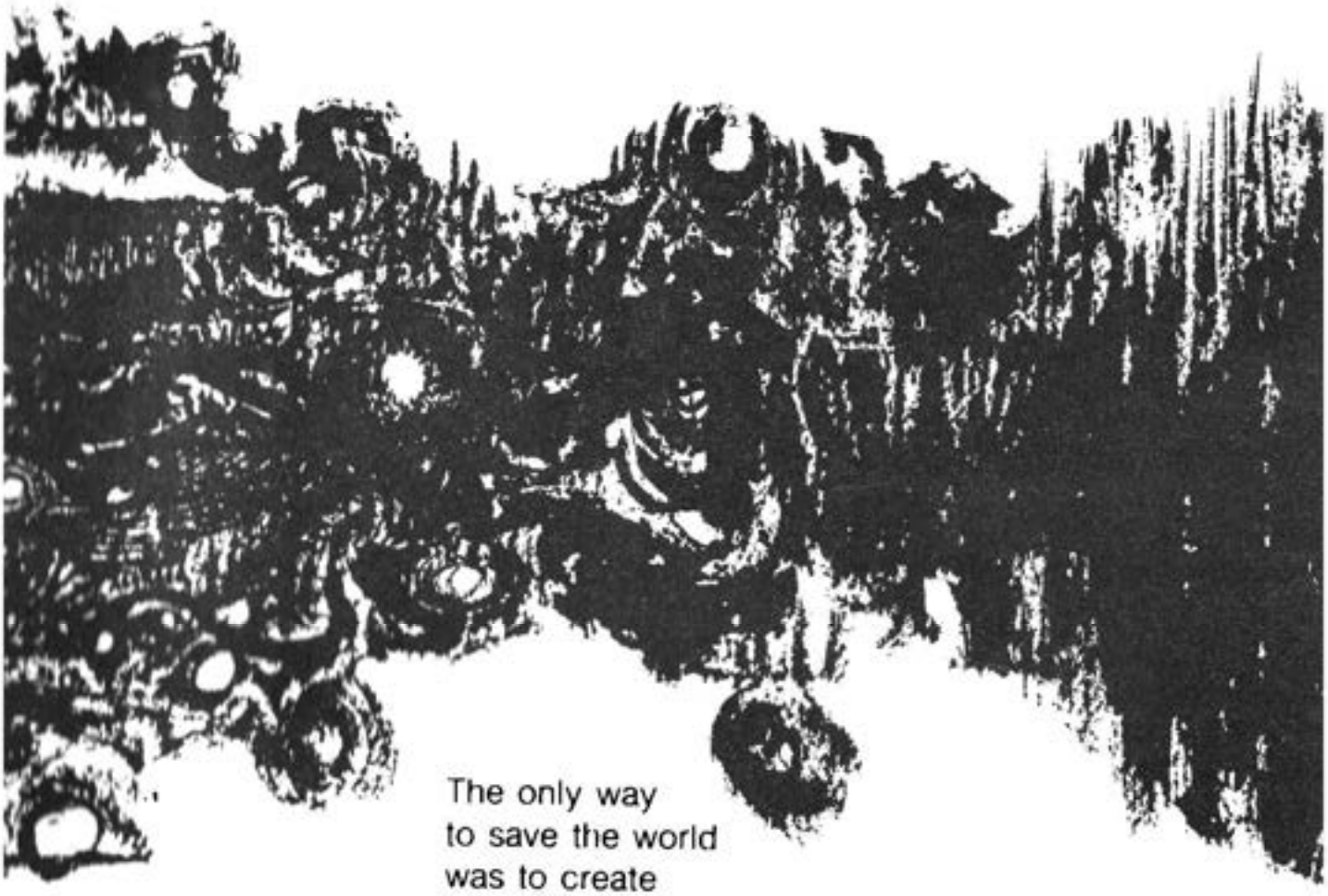


The only way
to save the world
was to create
a group of supermen.
But supermen see things
very differently
from mortals.

FREDERIK POHL

the gold at the starbow's end

CONSTITUTION ONE

Log of Lt. Col. Sheffield N. Jackman, USAF, commanding U.S. Starship *Constitution,* Day 40.

All's well, friends. Thanks to Mission Control for the batch of personal messages. We enjoyed the concert you beamed us, in fact we recorded most of it so we can play it over again when communication gets hairy.

We are now approaching the six-week point in our expedition to Alpha Centauri, Planet Aleph, and now that we've passed the farthest previous manned distance from Earth we're really beginning to feel as if we're on our way. Our latest navigation check confirms Mission Control's plot, and we estimate we should be crossing the orbit of Pluto at approximately 1631 hours, ship time, of Day 40, which is today. Letski has been keeping track of the time dilation effect, which is beginning to be significant now that we are traveling about some six percent of the speed of light, and says this would make it approximately a quarter of two in the morning your time, Mission Control. We voted to consider that the "coastal waters" mark. From then on we will have left the solar system behind and thus will be the first human beings to enter upon the deeps of interstellar space. We plan to have a ceremony. Letski and Ann Becklund have made up an American flag for jettisoning at that point, which we will do through the Number Three survey port, along with the prepared stainless-steel plaque containing the President's commissioning speech. We are also throwing in some private articles for each of us. I am contributing my Air Academy class ring.

Little change since previous reports. We are settling down nicely to our routine. We finished up all our post-launch checks weeks ago, and as Dr. Knefhausen predicted we began to find time hanging heavy on our hands. There won't be much to keep us busy between now and when we arrive at the planet Alpha-Aleph that is really essential to the operating of the spaceship. So we went along with Kneffie's proposed recreational schedule, using the worksheets prepared by the NASA Division of Flight Training and Personnel Management. At first—I think the boys back in Indianapolis are big enough to know this—it met with what you might call a cool reception. The general consensus was that this business of learning number theory and the calculus of statement, which is what they handed us for openers, was for the birds. We figured we weren't quite desperate enough for that yet, so we fooled around with other things. Ann and Will Becklund played a lot of chess. Dot Letski began writing a verse adaptation of "War and Peace." The rest of us hacked around with the equipment, and making astronomical observations and gabbing. But all that began to get tiresome pretty fast, just as Kneffie said it would at the briefings.

We talked about his idea that the best way to pass time in a spaceship was learning to get interested in mathematical problems—no mass to transport, no competititve element to get tempers up and all that. It began to make sense. So now Letski is in his tenth day of trying to find a formula for primes, and my own dear Flo is trying to prove Goldbach's Conjecture by means of the theory of congruences. (This is the girl who two months ago couldn't add up a laundry list!) It certainly passes the time.

Medically, we are all fit. I will append the detailed data on our blood pressures, pulses, et cetera, as well as the tape from the rocket and navigating systems readouts. I'll report again as scheduled. Take care of Earth for us we're looking forward to seeing it again, in a few years!

WASHINGTON ONE

There was a lull in the urban guerrilla war in Washington that week. The chopper was able to float right in to the South Lawn of the White House no sniper fire, no heat-seeking missiles, not even rock-throwing. Dr Dieter von Knefhausen stared suspiciously at the knot of weary-looking pickets in their permitted fifty yards of space along the perimeter. They didn't look militant, probably Gay Lib or, who knew what, maybe nature-food or single-tax; at any rate no rocks came from them, only a little disorganized booing as the helicopter landed. Knefhausen bowed to *Herr Omnes* sardonically, hopped nimbly out of the chopper and got out of the way as it took off again, which it did at once. He didn't trouble to run to the White House. He strolled. He did not fear these simple people, even if the helicopter pilot did. Also he was not really eager to keep his appointment with the President.

The ADC who frisked him did not smile. The orderly who conducted him to the West Terrace did not salute. No one relieved him of the dispatch case with his slides and papers, although it was heavy. You could tell right away when you were in the doghouse, he thought, ducking his head from the rotor blast as the pilot circled the White House to gain altitude before venturing back across the spread-out city.

It had been a lot different in the old days, he thought with some nostalgia. He could remember every minute of those old days. It was right here, this portico, where he had stood before the world's press and photographers to tell them about the Alpha-Aleph Project. He had seen his picture next to the President's on all the front pages, watched himself on the TV newscasts, talking about the New Earth that would give America an entire colonizable planet four light-years away. He remembered the launch at the Cape, with a million and a half invited guests from all over the world, foreign statesmen and scientists eating their hearts out with envy, American lead-

ers jovial with pride. The orderlies saluted then, all right. His lecture fees had gone clear out of sight. There was even talk of making him the Vice Presidential candidate in the next election—and it could have happened, too, if the election had been right then, and if there hadn't been the problem of his being born in another country.

Now it was all different. He was taken up in the service elevator. It wasn't so much that Knefhausen minded for his own sake, he told himself, but how did the word get out that there was trouble? Was it only the newspaper stories? Was there a leak?

The Marine orderly knocked once on the big door of the Cabinet room, and it was opened from inside.

Knefhausen entered.

"Come in, Dieter, boy, pull up a pew." No Vice President jumping up to grab his arm and slap his back. His greeting was thirty silent faces turned toward him, some reserved, some frankly hostile. The full Cabinet was there, along with half a dozen department heads and the President's personal action staff, and the most hostile face around the big oval table was the President's own.

Knefhausen bowed. An atavistic hankering for lyceum-cadet jokes made him think of clicking his heels and adjusting a monocle, but he didn't have a monocle and didn't yield to impulses like that. He merely took his place standing at the foot of the table and, when the President nodded, said, "Good morning, gentlemen, and ladies. I assume you want to see me about the stupid lies the Russians are spreading about the Alpha-Aleph program."

"*Roobarooba,*" they muttered to each other.

The President said in his sharp tenor, "So you think they are just lies?"

"Lies or mistakes, Mr. President, what's the difference? We are right and they are wrong, that's all."

"*Roobaroobarooba.*"

The Secretary of State looked inquiringly at the President, got a nod and said: "Dr. Knefhausen, you know I've been on your team a long time and I don't want to disagree with any statement you care to make, but are you so sure about that? There are some mighty persuasive figures comin' out of the Russians."

"They are false, Mr. Secretary."

"Ah, well, Dr. Knefhausen. I might be inclined to take your word for it, but others might not. Not cranks or malcontents, Dr. Knefhausen, but good, decent people. Do you have any evidence for them?"

"With your permission, Mr. President?" The President nodded again. Knefhausen unlocked his dispatch case and drew out a slim sheaf of slides. He handed them to a major of Marines, who looked to the President for approval and then did what Knefhausen told him. The room lights went down and, after some

fiddling with the focus, the first slide was projected over Knefhausen's head. It showed a huge array of Y-shaped metal posts, stretching away into the distance of a bleak, powdery looking landscape.

"This picture is our radio telescope on Farside, the Moon," he said. "It is never visible from the Earth, because that portion of the Moon's surface is permanently turned away from us, for which reason we selected it for the site of the telescope. There is no electrical interference of any kind. The instrument is made up of thirty-three million separate dipole elements, aligned with an accuracy of one part in several million. Its actual size is an approximate circle eighteen miles across, but by virtue of the careful positioning its performance is effectively equal to a telescope with a diameter of some twenty-six miles. Next slide, please."

Click. The picture of the huge RT display swept away and was replaced by another similar—but visibly smaller and shabbier—construction.

"This is the Russian instrument, gentlemen. And ladies. It is approximately one-quarter the size of ours in diameter. It has less than one tenth as many elements, and our reports they are classified, but I am informed this gathering is cleared to receive this material? Yes—our reports indicate the alignment is very crude. Even terrible, you could say.

"The difference between the two instruments in information-gathering capacity is roughly a hundred to one, in our favor. Lights, please.

"What this means," he went on smoothly, smiling at each of the persons around the table in turn as he spoke, "is that if the Russians say 'no' and we say 'yes,' bet on 'yes.' Our radio telescope can be trusted. Theirs cannot."

The meeting shifted uneasily in its chairs. They were as anxious to believe Knefhausen as he was to convince them, but they were not sure.

Representative Belden, the Chairman of the House Ways and Means Committee, spoke for all of them. "Nobody doubts the quality of your equipment. Especially," he added, "since we still have bruises from the job of paying for it. But the Russians made a flat statement. They said that Alpha Centauri can't have a planet larger than one thousand miles in diameter, or nearer than half a billion miles to the star. I have a copy of the Tass release here. It admits that their equipment is inferior to our own, but they have a statement signed by twenty-two academicians that says their equipment could not miss on any object larger, or nearer, than what I have said, or on any body of any kind which would be large enough to afford a landing place for our astronauts. Are you familiar with this statement?"

"Yes, of course, I have read it—"

"Then you know that they state positively that the planet you call 'Alpha-Aleph' does not exist."

"Yes, sir, that is what they state."

"Moreover, statements from authorities at the Paris Observatory and the UNESCO Astrophysical Center at Trieste, and from England's Astronomer Royal, all say that they have checked and confirmed their figures."

Knefhaušen nodded cheerfully. "That is correct, Representative Belden. They confirm that if the observations are as stated, then the conclusions drawn by the Soviet installation at Novy Brezhnevgrad on Farside naturally follow. I don't question the arithmetic. I only say that the observations are made with inadequate equipment, and thus the Soviet astronomers have come to a false conclusion. But I do not want to burden your patience with an unsupported statement," he added hastily as the Congressman opened his mouth to speak again, "so I will tell you all there is to tell. What the Russians say is theory. What I have to counter is not merely better theory, but also objective fact. I know Alpha-Aleph is there because I have seen it! Lights again, Major! And the next slide, if you please."

The screen lit up and showed glaring bare white with a sprinkling of black spots, like dust. A large one appeared in the exact center of the screen, with a dozen lesser ones sprinkled around it. Knefhausen picked up a flash pointer and aimed its little arrowhead of light at the central dot.

"This is a photographic negative," he said, "which is to say that it is black where the actual scene is white and vice versa. Those objects are astronomical. It was taken from our Briareus XII satellite near the orbit of Jupiter, on its way out to Neptune fourteen months ago. The central object is the star Alpha Centauri. It was photographed with a special instrument which filters out most of the light from the star itself, electronic in nature and something like the coronascope which is used for photographing prominences on our own Sun. We hoped that by this means we might be able to photograph the planet Alpha-Aleph. We were successful, as you can see." The flashpointer laid its little arrow next to the nearest small dot to the central star. "That, gentlemen, and ladies, is Alpha-Aleph. It is precisely where we predicted it from radio-telescope data."

There was another buzz from the table. In the dark it was louder than before. The Secretary of State cried sharply, "Mr. President! Can't we release this photograph?"

"We will release it immediately after this meeting," said the President.

"Roobarooba."

Then the committee chairman: "Mr. President, I'm sure if you say that's the planet we want, then it's the planet. But others outside this country may wonder, for indeed all those dots look alike to me. Just to satisfy a layman's curiosity, *how* do

you know that is Alpha-Aleph?"

"Slide Number Four, please—and keep Number Three in the carriage." The same scene, subtly different. "Note that in this picture, gentlemen, that one object, there, is in a different position. It has moved. You know that the stars show no discernible motion. It has moved because this photograph was taken eight months later, as Briareus XII was returning from the Neptune flyby, and the planet Alpha-Aleph has revolved in its orbit. This is not theory, it is evidence, and I add that the original tapes from which the photoprint was made are stored in Goldstone so there is no question that arises of foolishness."

"*Roobarooba,*" but in a higher and excited key.

Gratified, Knefhausen nailed down his point. "So, Major, if you will now return to Slide Three, yes— And if you will flip back and forth, between Three and Four, as fast as you can Thank you." The little black dot called Alpha-Aleph bounced back and forth like a tennis ball, while all the other star points remained motionless. "This is what is called the blank comparator process, you see. I point out that if what you are looking at is not a planet it is, Mr. President, the funnest star you ever saw. Also it is exactly at the distance and exactly with the orbital period we specified based on the RT data. Now, are there any more questions?"

"No, sir!" "That's great, Kneffie!" "I think that wraps it up." "That'll show the Commies."

The President's voice overrode them.

"I think we can have the lights on now, Major Merton," he said. "Dr. Knefhausen, thank you. I'd appreciate it if you would remain nearby for a few minutes, so you can join Murray and myself in the study to check over the text of our announcement before we release these pictures." He nodded sober dismissal to his chief science adviser and then, reminded by the happy faces of his cabinet, remembered to smile with pleasure.

CONSTITUTION TWO

Sheffield Jackman's log. Starship *Constitution.* Day 95.

According to Letski we are now traveling at just about fifteen percent of the speed of light, almost 30,000 miles per second. The fusion thrusters are chugging away handsomely; as predicted, the explosions sequence fast enough so that we feel them only as vibration. Fuel, power and life-support curves are sticking tight to optimum. No sweat of any kind with the ship, or, actually, with anything else.

Relativistic effects have begun to show up as predicted. Jim Barstow's spectral studies show the stars in front of us are shifting to the blue end, and the Sun and other stars behind us are shifting to the red. Without the spectroscope you can't see much, though. Beta Circini looks a

little funny, maybe. As for the Sun, it's still very bright—Jim logged it as minus-six magnitude a few hours ago—and as I've never seen it in quite that way before, I can't tell whether the color looks bright or not. It certainly isn't the golden yellow I associate with type GO, but neither is Alpha Centauri ahead of us, and I don't really see a difference between them. I think the reason is simply that they are so bright that the color impressions are secondary to the brightness impressions, although the spectroscope, as I say, does show the differences. We've all taken turns at looking back. Naturally enough, I guess. We can still make out the Earth and even the Moon in the telescope, but it's chancy. Ski almost got an eyeful of the Sun at full light-gathering amplitude yesterday because the visual separation is only about twelve seconds of arc now. In a few more days they'll be too close to separate.

Let's see, what else?

We've been having a fine time with the recreational-math program. Ann has taken to binary arithmetic like a duck to water. She's involved in what I take to be some sort of statistical experimentation—we don't pry too much into what the others are doing until they're ready to talk about it—and, of all things, she demanded we produce coins to flip. Well, naturally none of us had taken any money with us! Except that it turns out two of us did. Ski had a Russian silver ruble that his mother's uncle had given him for luck, and I found an old Philadelphia transit token in my pocket. Ann rejected my transit token as too light to be reliable, but she now spends happy hours flipping the ruble, heads or tails, and writing down the results as a series of six-place binary numbers, heads for 1 and tails for 0. After about a week my curiosity got too much so I began hinting to find out what she was doing. When I ask she says things like, "By means of the easy and the simple we grasp the laws of the whole world." When I say that's nice, but what does she hope to grasp by flipping the coin, she says, "When the laws of the whole world are grasped, therein lies perfection." So, as I say, we don't press each other and I leave it there. But it passes the time.

Kneffie would be proud of himself if he could see how our recreation keeps us busy. None of us has managed to prove Fermat's Last Theorem yet or anything like that, but of course that's the whole point. If we could *solve* the problems, we'd have used them up, and then what would we do for recreation? It does exactly what it was intended to. It keeps us mentally alert on this long and intrinsically rather dull boat ride.

Personal relationships? Jes' fine, fellows, jes' fine. A lot better than any of us really hoped, back there at the personal-hygiene briefings in Mission Control. The girls take the stripey pills every day until three days before their periods, then they

take the green pills for four days, then they lay off pills for four days, then back to the stripes. There was a little embarrassed joking about it at first, but now it's strictly routine, like brushing our teeth. We men take our red pills every day—Ski christened them "stop lights"—until the girls tell us they're about to lay off—you know what I mean, each girl tells her husband then we take the Blue Devil—that's what we call the antidote—and have a hell of a time until the girls start on the stripes again. None of us thought any of this would work, you know. But it works fine. I don't even think sex until Flo kisses my ear and tells me she's getting ready to, excuse the expression, get in heat, and then like wow. Same with everybody. The aft chamber with the nice wide bunks we call Honeymoon Hotel. It belongs to whoever needs it, and never once have both bunks been used. The rest of the time we just sleep wherever is convenient, and nobody gets up tight about it.

Excuse my getting personal, but you told me you wanted to know everything, and there's not much else to tell. All systems remain optimum. We check them over now and again, but nothing has given any trouble, or even looked as though it might be thinking about giving trouble later on. And there's absolutely nothing worth looking at outside, but stars. We've all seen them about as much as we need to by now. The plasma jet thrums right along at our point-seven-five G. We don't even hear it any more.

We've got used to the recycling system. None of us really thought we'd get with the suction toilet, not to mention what happens to the contents, but it was only a little annoying the first few days. Now it's fine. The treated product goes into the algae tanks. The sludge from the algae goes into the hydroponic beds, but by then, of course, it's just greeny-brown vegetable matter. That's all handled semi-automatically anyway, of course, so our first real contact with the system comes in the kitchen.

The food we eat comes in the form of nice red tomatoes and nourishing rice pilaf and stuff like that. (We do miss animal protein a little; the frozen stores have to last a long time, so each hamburger is a special feast and we only have them once a week or so.) The water we drink comes actually out of the air, condensed by the dehumidifiers into the reserve supply, where we get it to drink. It's nicely aerated and chilled and tastes fine. Of course, the way it gets into the air in the first place is by being sweated out of our pores or transpired from the plants—which are irrigated direct from the treated product of the reclamation tanks—and we all know, when we stop to think of it, that every molecule of it has passed through all our kidneys forty times by now. But not directly. That's the point. What we drink is clear sweet dew. And if it once was something else, can't you say the same of Lake Erie?

Well, I think I've gone on long

enough. You've probably got the idea by now: We're happy in the service, and we all thank you for giving us this pleasure cruise!

WASHINGTON TWO

Waiting for his appointment with the President, Dr. Knefhausen reread the communique from the spaceship, chuckling happily to himself. "Happy in the service." "Like wow." "Kneffie would be proud of himself." Indeed Kneffie was. And proud of them, those little wonders, there! So brave. So strong.

He took as much pride in them as though they had been his own sons and daughters, all eight of them. Everybody knew the Alpha-Aleph project was Knefhausen's baby, but he tried to conceal from the world that, in his own mind, he spread his fatherhood to include the crew. They were the pick of the available world, and it was he who had put them where they were. He lifted his head, listening to the distant chanting from the perimeter fence where today's disgusting exhibition of mob violence was doing its best to harass the people who were making the world go. What great lumps they were out there, with their long hair and their dirty morals. The heavens belonged only to angels, and it was Dieter von Knefhausen who had picked the angels. It was he who had established the selection procedures—and if he had done some things that were better left unmentioned to make sure the procedures worked, what of it? It was he who had conceived and adapted the highly important recreation schedule, and above all he who had conceived the entire project and persuaded the President to make it come true. The hardware was nothing, only money. The basic scientific concepts were known; most of the components were on the shelves; it took only will to put them together. The will would not have existed if it had not been for Knefhausen, who announced the discovery of Alpha-Aleph from his radio-observatory on Farside—gave it that name, although as everyone realized he could have called it by any name he chose, even his own—and carried on the fight for the project by every means until the President bought it.

It had been a hard, bitter struggle. He reminded himself with courage that the worst was still ahead. No matter. Whatever it cost, it was done, and it was worthwhile. These reports from *Constitution* proved it. It was going exactly as planned, and—

"Excuse me, Dr. Knefhausen."

He looked up, catapulted back from almost half a light-year away.

"I said the President will see you now, Dr. Knefhausen," repeated the usher.

"Ah," said Knefhausen. "Oh, yes, to be sure. I was deep in thought."

"Yes, sir. This way, sir."

They passed a window and there was a quick glimpse of the turmoil at the gates, picket signs used like battleaxes, a thin blue cloud of tear gas, the sounds of shouting. "King Mob

is busy today," said Knefhausen absently.

"There's no danger, sir. Through here, please."

The President was in his private study, but to Knefhausen's surprise he was not alone. There was Murray Amos, his personal secretary, which one could understand; but there were three other men in the room. Knefhausen recognized them as the Secretary of State, the Speaker of the House and, of all people, the Vice President. How strange, thought Knefhausen, for what was to have been a confidential briefing for the President alone! But he rallied quickly.

"Excuse me, Mr. President," he said cheerfully, "I must have understood wrong. I thought you were ready for our little talk."

"I am ready, Knefhausen," said the President. The cares of his years in the White House rested heavily on him today, Knefhausen thought critically. He looked very old and very tired. "You will tell these gentlemen what you would have told me."

"Ah, yes, I see," said Knefhausen, trying to conceal the fact that he did not see at all. Surely the President did not mean what his words said, therefore it was necessary to try to see what was his thought. "Yes, to be sure. Here is something, Mr. President. A new report from the *Constitution!* It was received by burst transmission from the Lunar Orbiter at Goldstone just an hour ago, and has just come from the decoding room. Let me read it to you. Our brave astronauts are getting along splendidly, just as we planned. They say—"

"Don't read us that just now," said the President harshly. "We'll hear it, but first there is something else. I want you to tell this group the full story of the Alpha-Aleph project."

"The full story, Mr. President?" Knefhausen hung on gamely. "I see. You wish me to begin with the very beginning, when first we realized at the observatory that we had located a planet—"

"No, Knefhausen. Not the cover story. The truth."

"Mr. President!" cried Knefhausen in sudden agony. "I must inform you that I protest this premature disclosure of vital—"

"The truth, Knefhausen!" shouted the President. It was the first time Knefhausen had ever heard him raise his voice. "It won't go out of this room, but you must tell them everything. Tell them why it is that the Russians were right and we lied! Tell them why we sent the astronauts on a suicide mission, ordered to land on a planet that we knew all along did not exist!"

CONSTITUTION THREE

Shef Jackman's journal, Day 130.

It's been a long time, hasn't it? I'm sorry for being such a lousy correspondent. I was in the middle of a thirteen-game chess series with Eve Barstow—she was playing the Bobby Fischer games and I was playing in

the style of Reshevsky—and Eve said something that made me think of old Kneffie, and that, of course, reminded me I owed you a transmission. So here it is.

In my own defense, though, it isn't only that we've been busy with other things. It takes a lot of power for these chatty little letters. Some of us aren't so sure they're worthwhile. The farther we get the more power we need to accumulate for a transmission. Right now it's not so bad, but, well, I might as well tell you the truth, right? Kneffie made us promise that. Always tell the truth, he said, because you're part of the experiment, and we need to know what you're doing, all of it. Well, the truth in this case is that we were a little short of disposable power for a while because Jim Barstow needed quite a lot for research purposes. You will probably wonder what the research is, but we have a rule that we don't criticize, or even talk about, what anyone else is doing until they're ready, and he isn't ready yet. I take the responsibility for the whole thing, not just the power drain but the damage to the ship. I said he could go ahead with it.

We're going pretty fast now, and to the naked eye the stars fore and aft have blue-shifted and red-shifted nearly out of sight. It's funny but we haven't been able to observe Alpha-Aleph yet, even with the disk obscuring the star. Now, with the shift to the blue, we probably won't see it at all until we slow down. We can still see the Sun, but I guess what we're seeing is ultraviolet when it's home. Of course the relativistic frequency shifts mean we need extra compensating power in our transmissions, which is another reason why, all in all, I don't think I'll be writing home every Sunday between breakfast and the baseball game, the way I ought to!

But the mission's going along fine. The "personal relationships" keep on being just great. We've done a little experimental research there, too, that wasn't on the program, but it's all O.K. No problems. Worked out great. I think maybe I'll leave out some of the details, but we found some groovy ways to do things. Oh, hell, I'll give you one hint: Dot Letski says I should tell you to get the boys at Mission Control to crack open two of the stripey pills and one of the Blue Devils, mix them with a quarter-teaspoon of black pepper and about 2 cc of the conditioner fluid from the recycling system. Serve over orange sherbet, and oh, boy. After the first time we had it Flo made a crack about its being "seminal", which I thought was a private joke, but it broke everybody up. Dot figured it out for herself weeks ago. We wondered how she got so far so fast with "War and Peace" until she let us into the secret. Then we found out what it could do for you, both emotionally and intellectually: the creative over the arousing, as they say.

Ann and Jerry Letski used up their

own recreational programs early—real early. They were supposed to last the whole voyage! They swapped microfiches, on the grounds that each was interested in an aspect of causality and they wanted to see what the other side had to offer. Now Ann is deep into people like Kant and Carnap, and Ski is sore as a boil because there's no *Achillea millefolium* in the hydroponics garden. Needs the stalks for his researches, he says. He is making do with flipping his ruble to generate hexagrams; in fact we all borrow it now and then. But it's not the right way. Honestly, Mission Control, he's right. Some thought should have been given to our other needs, besides sex and number theory. We can't even use chop bones from the kitchen wastes, because there isn't any kitchen waste. I know you couldn't think of everything, but still Anyway, we improvise as best we can, and mostly well enough.

Let's see, what else? Did I send you Jim Barstow's proof of Goldbach's Conjecture? Turned out to be very simple once he had devised his multiplex parity analysis idea. Mostly we don't fool with that sort of stuff any more, though. We got tired of number theory after we'd worked out all the fun parts, and if there is any one thing that we all work on—apart from our private interests—it is probably the calculus of statement. We don't do it systematically, only as time permits from our other activities, but we're all pretty well convinced that a universal grammar is feasible enough, and it's easy enough to see where that leads.

Flo has done more than most of us. She asked me to put in that Boole, Venn and all those old people were on the wrong track, but she thinks there might be something to Leibniz's "calculus ratiocinator" idea. There's a J. W. Swanson suggestion that she likes for multiplexing languages. (Jim took off from it to work out his parity analysis.) The idea is that you devise a double-vocabulary language. One set of meanings is conveyed, say, by phonemes, that is, the shape of the words themselves. Another set is conveyed by pitch. It's like singing a message, half of it conveyed by the words, the other half by the tune—like rock music. You get both sets of meanings at the same time. She's now working on third, fourth and nth dimensions so as to convey many kinds of meanings at once, but it's not very fruitful so far —except for using sex as one of the communications media. Most of the senses available are too limited to convey much.

By the way, we checked out all the existing "artificial languages" as best we could—put Will Becklund under hypnotic regression to recapture the Esperanto he'd learned as a kid, for instance. But they were all blind alleys. Didn't even convey as much as standard English or French.

Medical readouts follow. We're all healthy. Eve Barstow gave us a medical check to make sure. Ann and Ski

had little rough spots in a couple of molars so she filled them for the practice more than because they needed it. I don't mean practice in filling teeth; she wanted to try acupuncture instead of procaine. Worked fine.

We all have this writing-to-Daddy-and-Mommy-from-Camp-Tanglewood feeling and we'd like to send you some samples of our home handicrafts. The trouble is there's so much of it. Everybody has something he's personally pretty pleased with, like Barstow's proof of most of the classic math problems and my multi-media adaptation of *"Sur le pont d'Avignon"*. It's hard to decide what to send you with the limited power available, and we don't want to waste it with junk. So we took a vote and decided the best thing was Ann's verse retelling of "War and Peace". It runs pretty long. I hope the power holds it. I'll transmit as much of it as I can. . . .

WASHINGTON THREE

Spring was well advanced in Washington. Along the Potomac the cherry blossoms were beginning to bud, and Rock Creek Park was the pale green of new leaves. Even through the *whap, whap* of the helicopter rotor Knefhausen could hear an occasional rattle of small-arms fire from around Georgetown, and the Molotov cocktails and tear gas from the big Water Gate apartment development at the river's edge were steaming up the sky with smoke and fumes. They never stopped, thought Knefhausen irritably. What was the good of trying to save people like this?

It was distracting. He found himself dividing his attention into three parts—the scarred, greening landscape below; the escort fireships that orbited around his own chopper; and the papers on his lap. All of them annoyed him. He couldn't keep his mind on any of them. What he liked least was the report from the *Constitution.* He had had to get expert help in translating what it was all about, and he didn't like the need, and even less liked the results. What had gone wrong? They were his kids, hand picked. There had been no hint of, for instance, hippiness in any of them, at least not past the age of twenty, and only for Ann Becklund and Florence Jackman even then. How had they got into this *I Ching* foolishness, and this stupid business with the *Achillea millefolium,* better known as the common yarrow? What "experiments"? Who started the disgustingly antiscientific acupuncture thing? How dared they depart from their programmed power budget for "research purposes," and what were the purposes? Above all, what was the "damage to the ship"?

He scribbled on a pad:

> With immediate effect, cut out the nonsense. I have the impression you are all acting like irresponsible children. You are letting down the ideals of our program.
>
> Knefhausen

After running the short distance from the chopper pad to the shelter of the guarded White House entrance, he gave the slip to a page from the Message Center for immediate encoding and transmission to the *Constitution* via Goldstone, Lunar Orbiter and Farside Base. All they needed was a reminder, he persuaded himself, then they would settle down. But he was still worried as he peered into a mirror, patted his hair down, smoothed his moustache with the tip of a finger and presented himself to the President's chief secretary.

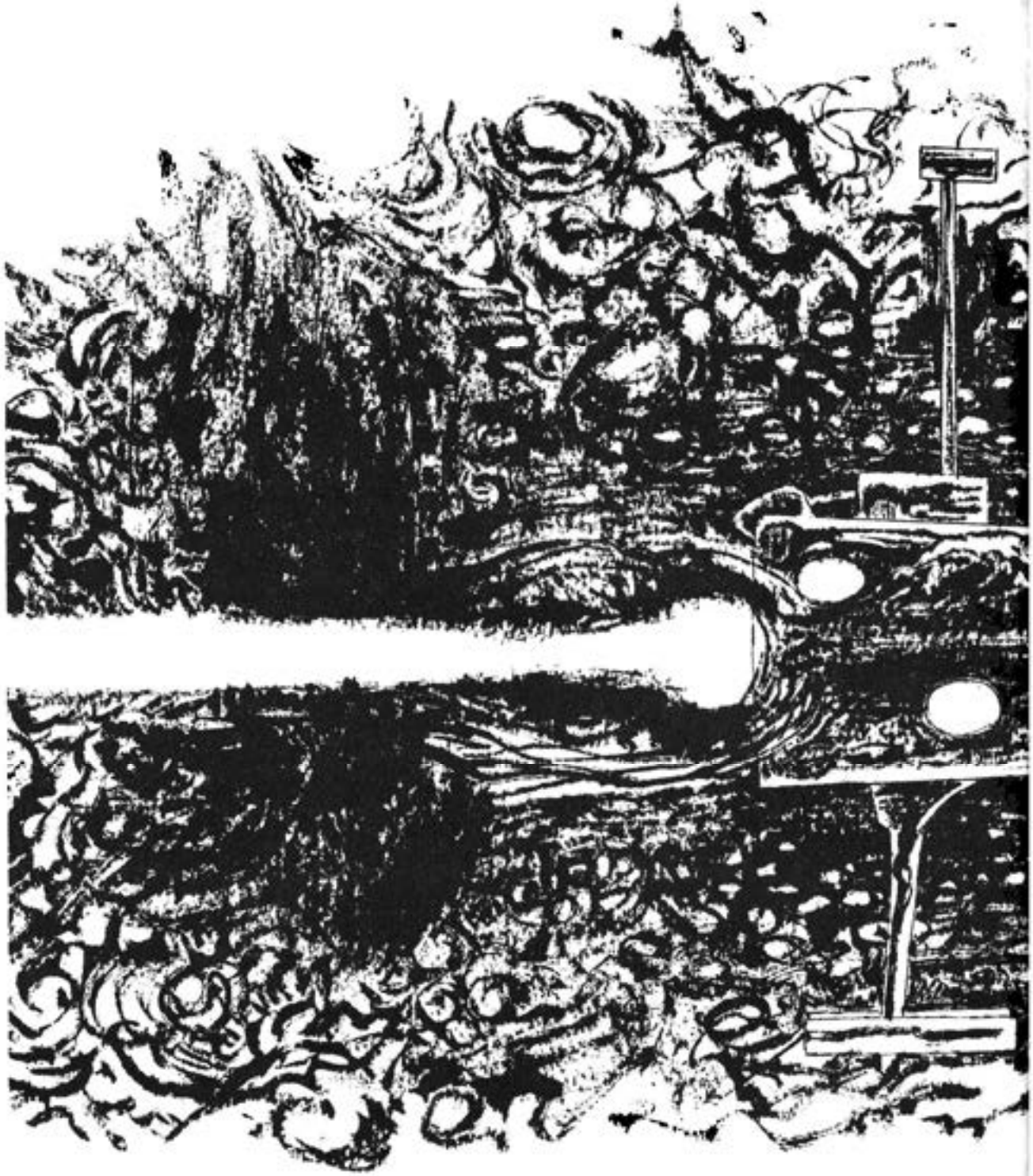
This time they went down, not up. Knefhausen was going to the basement chamber that had been successively Franklin Roosevelt's swimming pool, the White House press lounge, a TV studio for taping jolly little two-shots of the President with congressmen and senators for the folks back home to see and, now, the heavily armored bunker in which anyone trapped in the White House in the event of a successful attack from the city outside could hold out for several weeks, during which time the Fourth Armored would surely be able to retake the grounds from its bases in Maryland. It was not a comfortable room, but it was a safe one. Besides being armored against attack, it was as thoroughly soundproof, spyproof and leakproof as any chamber in the world, not excepting the Under-Kremlin, or the Colorado NORAD base.

Knefhausen was admitted and seated, while the President and a couple of others were in whispered conversation at one end of the room, and the several dozen other people present craned their necks to stare at Knefhausen.

After a moment the President raised his head. "All right," he said. He drank from a crystal goblet of water, looking wizened and weary, and disappointed at the way a boyhood dream had turned out: the presidency wasn't what it had seemed to be, from Muncie, Indiana. "We all know why we're here. The government of the United States has given out information which was untrue. It did so knowingly and wittingly, and we've been caught at it. Now we want you to know the background, and so Dr. Knefhausen is going to explain the Alpha-Aleph project. Go ahead, Knefhausen."

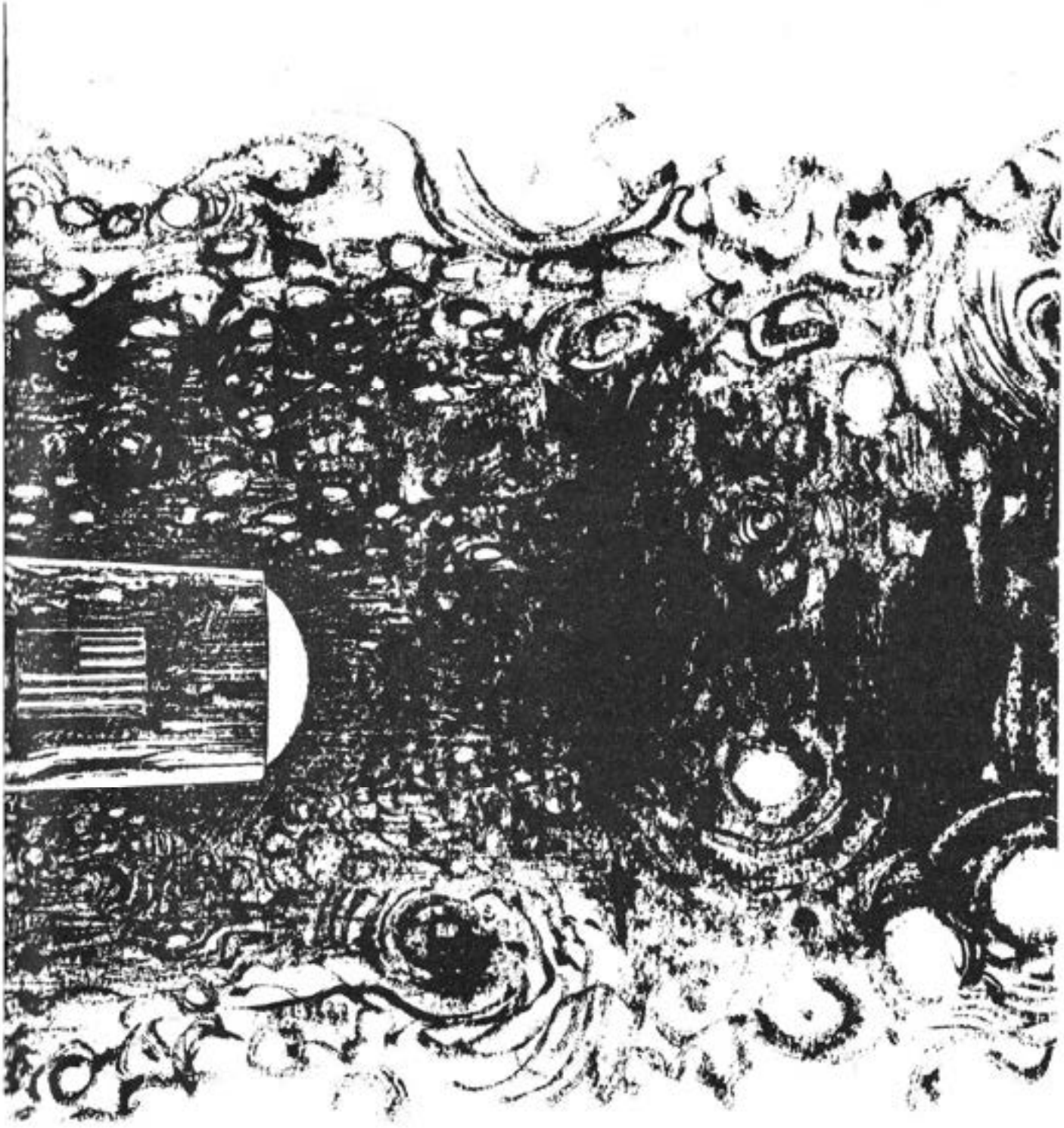
Knefhausen stood up and walked unhurryingly to the little lectern set up for him, off to one side of the President. He opened his papers on the lectern, studied them thoughtfully for a moment with his lips pursed and said:

"As the President has said, the Alpha-Aleph project is a camouflage. A few of you learned this some months ago, and then you referred to it with other words. 'Fraud.' 'Fake.' Words like that. But if I may say it in French, it is not any of those words, it is a legitimate *ruse de guerre*. Not the *guerre* against our political enemies, or even against the dumb kids in the streets with their Molotov



cocktails and bricks. I do not mean those wars, I mean the war against ignorance. For you see, there were certain signs—certain *things*—we had to know for the sake of science and progress. Alpha-Aleph was designed to find them out for us.

"I will tell you the worst parts first," he said. "Number one, there is no such planet as Alpha-Aleph. The Russians were right. Number two, we knew this all along. Even the photographs we produced were fakes, and in the long run the rest of



the world will find this out and they will know of our *ruse de guerre.* I can only hope that they will not find out too soon, for if we are lucky and keep the secret for a while, then I hope we will be able to produce good results to justify what we have done. Number three, when the *Constitution* reaches Alpha Centauri there will be no place for them to land, no way to leave their spacecraft, no sources of raw materials which they might be able to use to make fuel to return—nothing but the

star and empty space. This fact has certain consequences.

The *Constitution* was designed with enough hydrogen fuel capacity for a one-way flight, plus maneuvering reserve. There will not be enough for them to come back, and the source they had hoped to tap, namely the planet Alpha-Aleph does not exist, so they will not come back. Consequently they will die there. Those are the bad things to which I must admit."

There was a sighing murmur from the audience. The President was frowning absently to himself. Knefhausen waited patiently for the medicine to be swallowed, then went on.

"You ask, then, why have we done this thing? Condemning eight young people to their death? The answer is simple: Knowledge. To put it in other words, we must have the basic scientific knowledge to protect the free world. You are all familiar, I si . . . I believe, with the known fact that basic scientific advances have been very few these past ten years and more. Much R&D. Much technology. Much applications. But in the years since Einstein, or better since Weizsäcker, very little basic.

"But without the new basic knowledge, the new technology must soon stop developing. It will run out of steam, you see.

"Now I must tell you a story. It is a true scientific story, not a joke; I know you do not want jokes from me at this time. There was a man named de Bono, a Maltese, who wished to investigate the process of creative thinking. There is not very much known about this process, but he had an idea how he could find something out. So he prepared for an experiment a room that was stripped of all furniture, with two doors, one across from the other. You go in one door, cross the room and then you walk out the other. He put at the door that was the entrance some material—two flat boards, some ropes. And he got as his subjects some young children. Now he said to the children: 'This is a game we will play. You must go through this room and out the other door, that is all. If you do that, you win. But there is one rule. You must not touch the floor with your feet, or your knees, or with any part of your body, or your clothing. We had here a boy,' he said, 'who was very athletic and walked across on his hands, but he was disqualified. You must not do that. Now go, and whoever does it fastest will win some chocolates.'

"So he took away all of the children but the first one and, one by one, they tried. There were ten or fifteen of them, and each of them did the same thing. Some it took longer to figure it out, some figured it out right away, but it always was the same trick: they sat down on the floor, they took the boards and the ropes, and they tied one board to each foot and they walked across the

room like on skis. The fastest one thought of the trick right away and was across in a few seconds. The slowest took many minutes. But it was the same trick for all of them, and that was the first part of the experiment.

"Now this Maltese man, de Bono, performed the second part of the experiment. It was exactly like the first, with one difference. He did not give them two boards. He gave them only one board.

"And in the second part every child worked out the same trick, too, but it was, of course, a different trick. They tied the rope to the end of the single board and then they stood on it, and jumped up, tugging the rope to pull the board forward, hopping and tugging, moving a little bit at a time, and every one of them succeeded. But in the first experiment the average time to cross was maybe forty-five seconds. And in the second experiment the average time was maybe twenty seconds. With one board they did their job faster than with two.

"Perhaps now some of you see the point. Why did not any of the children in the first group think of this faster method of going across the room? It is simple. They looked at what they were given to use for materials and, they are like all of us, they wanted to use everything. But they did not need everything. They could do better with less, in a different way."

Knefhausen paused and looked around the room, savoring the moment. He had them now, he knew. It was just as it had been with the President himself, three years before. They were beginning to see the necessity of what had been done, and the pale, upturned faces were no longer as hostile, only perplexed and a little afraid.

He went on:

"So that is what Project Alpha-Aleph is about, gentlemen and ladies. We have selected eight of the most intelligent human beings we could find, healthy, young, very adventurous. Very creative. We played on them a nasty trick, to be sure. But we gave them an opportunity no one has ever had. The opportunity to *think*. To think for *ten years*. To think about basic questions. Out there they do not have the extra board to distract them. If they want to know something they cannot run to the library and look it up, and find that somebody has said that what they were thinking could not work. They must think it out for themselves.

"So in order to make this possible we have practiced a deception on them and it will cost them their lives. All right, that is tragic, yes. But if we take their lives we give them in exchange immortality.

"How do we do this? Trickery again, gentlemen and ladies. I do not say to them, 'Here, you must discover new basic approaches to science and tell them to us.' I camouflage the purpose, so that they will

not be distracted even by that. We have told them that this is recreational, to help them pass the time. This, too, is a *ruse de guerre*. The 'recreation' is not to help them make the trip, it is the whole purpose of the trip.

"So we start them out with the basic tools of science. With numbers: That is, with magnitudes and quantification, with all that scientific observations are about. With grammar: This is not what you learned when you were thirteen years old. It is a technical term; it means with the calculus of statement and the basic rules of communication—that is so they can learn to think clearly by communicating fully and without fuzzy ambiguity. We give them very little else, only the opportunity to mix these two basic ingredients and come up with new forms of knowledge.

"What will come of these things? That is a fair question. Unfortunately there is no answer—not yet. If we knew the answer in advance, we would not have to perform the experiment. So we do not know what will be the end result of this, but already they have accomplished very much. Old questions that have puzzled the wisest of scientists for hundreds of years they have solved already. I will give you one example. You will say, yes, but what does it *mean?* I will answer, I do not know, I only know that it is so hard a question that no one else has ever been able to answer it. It is a proof of a thing which is called Goldbach's Conjecture. Only a conjecture; you could call it a guess. A guess by an eminent mathematician many, many years ago, that every even number can be written as the sum of two prime numbers. This is one of those simple problems in mathematics that everyone can understand and no one can solve. You can say, 'Certainly, sixteen is the sum of eleven and five, both of which are prime numbers, and thirty is the sum of twenty-three and seven, which also are both prime, and I can give you such numbers for any even number you care to name.' Yes, you can; but can you prove that for *every* even number it will *always* be possible to do this? No. You cannot. No one has been able to, but our friends on the *Constitution* have done it, and this was in the first few months. They have yet almost ten years. I cannot say what they will do in that time, but it is foolish to imagine that it will be anything less than very much indeed. A new relativity, a new universal gravitation—I don't know, I am only saying words. But much."

He paused again. No one was making a sound. Even the President was no longer staring straight ahead without expression, but was looking at him.

"It is not yet too late to spoil the experiment, and so it is necessary for us to keep the secret a bit longer. But there you have it, gentlemen and ladies. That is the truth about Alpha-Aleph." He dreaded what would

come next, postponed it for a second by consulting his papers, shrugged, faced them and said: "Now, are there any questions?"

Oh, yes, there were questions. *Herr Omnes* was stunned a little, took a moment to overcome the spell of the simple and beautiful truths he had heard, but first one piped up, then another, then two or three shouting at once. There were questions, to be sure. Questions beyond answering. Questions he did not have time to hear, much less answer, before the next question was on him. Questions to which he did not know the answers. Questions, worst of all, to which the answers were like pepper in the eyes, enraging, blinding the people to sense. But he had to face them, and he tried to answer them. Even when they shouted so that outside the thick double doors the Marine guards looked at each other uneasily, and wondered what made the dull rumble that penetrated the very good soundproofing of the room. "What I want to know, who put you up to this?" "Mr. Chairman, nobody; it is as I have said." "But see now, Knefhausen, do you mean to tell us you're murderin' these good people for the sake of some Goldbach's theory?" "No, Senator, not for Goldbach's Conjecture, but for what great advances in science will mean in the struggle to keep the free world free." "You're confessing you've dragged the United States into a palpable fraud?" "A legitimate ruse of war, Mr. Secretary, because there was no other way." "The photographs, Knefhausen?" "Faked, General, as I have told you. I accept full responsibility." And on and on, the words "murder" and "fraud" and even "treason" coming faster and faster.

Until at last the President stood up and raised his hand. Order was a long time coming, but at last they quieted down.

"Whether we like it or not, we're in it," he said simply. "There is nothing else to say. You have come to me, many of you, with rumors and asked for the truth. Now you have the truth, and it is classified Top Secret and must not be divulged. You all know what this means. I will only add that I personally propose to see that any breach of this security is investigated with all the resources of the government, and punished with the full penalty of the law. I declare this a matter of national emergency, and remind you that the penalty includes the death sentence when appropriate—and I say that in this case it is appropriate." He looked very much older than his years, and he moved his lips as though something tasted bad in his mouth. He allowed no further discussion, and dismissed the meeting.

Half an hour later, in his private office, it was just Knefhausen and the President.

"All right," said the President, "it's

all hit the fan. The next thing is the world will know it. I can postpone that a few weeks, maybe even months. I can't prevent it."

"I am grateful to you, Mr. President, for—"

"Shut up, Knefhausen. I don't want any speeches. There is one thing I want from you, and that is an explanation: What the hell is this about mixing up narcotics and free love and so on?"

"Ah," said Knefhausen, "you refer to the most recent communication from the *Constitution.* Yes. I have already dispatched, Mr. President, a strongly worded order. Because of the communications lag it will not be received for some months, but I assure you the matter will be corrected."

The President said bitterly, "I don't want any assurances, either. Do you watch television? I don't mean 'I Love Lucy' and ball games, I mean news. Do you know what sort of shape this country is in? The bonus marches in 1932, the race riots in 1967—they were nothing. Time was when we could call out the National Guard to put down disorder. Last week I had to call out the Army to use against three companies of the Guard. One more scandal and we're finished, Knefhausen, and this is a big one."

"The purposes are beyond reproach—"

"Your purposes may be. Mine may be, or I try to tell myself it is for the good of science I did this, and not so I will be in the history books as the president who contributed a major breakthrough. But what are the purposes of your friends on the *Constitution?* I agreed to eight martyrs, Knefhausen. I didn't agree to forty billion dollars out of the nation's pockets to give your eight young friends ten years of gangbangs and dope."

"Mr. President, I assure you this is only a temporary phase. I have instructed them to straighten out."

"And if they don't, what are you going to do about it?" The President, who never smoked, stripped a cigar, bit off the end and lit it. He said, "It's too late for me to say I shouldn't have let you talk me into this. So all I will say is you have to show results from this flimflam before the lid blows off, or I won't be President any more, and I doubt that you will be alive."

CONSTITUTION FOUR

This is Shef again and it's, oh, let me see, about Day 250. 300? No, I don't think so. Look, I'm sorry about the ship date, but I honestly don't think much in those terms any more. I've been thinking about other things. Also I'm a little upset. When I tossed the ruble the hexagram was K'an, which is danger, over Li, the Sun. That's a bad mood in which to be communicating with you. We aren't vengeful types, but the fact is that some of us were pretty sore when we found out what you'd done. I don't *think* you need to worry, but I

wish I'd got a much better hexagram.

Let me tell you the good parts first. Our velocity is pushing point four oh C now. The scenery is beginning to get interesting. For several weeks the stars fore and aft have been drifting out of sight as the ones in front get up into the ultraviolet and the ones behind sink into the infrared. You'd think that as the spectrum shifts the other parts of the EMF bands would come into the visible range. I guess they do, but stars peak in certain frequencies, and most of them seem to do it in the visible frequencies, so the effect is that they disappear. The first thing was that there was a sort of round black spot ahead of us where we couldn't see anything at all, not Alpha Centauri, not Beta Centauri, not even the bright Circini stars. Then we lost the Sun behind us, and a little later we saw the blackout spread to a growing circle of stars there. Then the circles began to widen.

Of course, we know that the stars are really there. We can detect them with phase-shift equipment, just as we can transmit and receive your messages by shifting the frequencies. But we just can't see them any more. The ones in direct line of flight, where we have a vector velocity of .34c or .37c—depending on whether they are in front of us or behind us—simply aren't radiating in the visible band any more. The ones farther out to the side have been displaced visually because of the relativistic effects of our speed. But what it looks like is that we're running the hell out of Nothing, in the direction of Nothing, and it is frankly a little scary.

Even the stars off to one side are showing relativistic color shifts. It's almost like a rainbow, one of those full-circle rainbows that you see on the clouds beneath you from an airplane sometimes. Only this circle is all around us. Nearest the black hole in front the stars have frequency-shifted to a dull reddish color. They go through orange and yellow and a sort of leaf green to the band nearest the black hole in back, which are bright blue shading to purple. Jim Barstow has been practicing his farsight on them, and he can relate them to the actual sky map. But I can't. He sees something in the black hole in front of us that I can't see. He says he thinks it's a bright radio source, probably Centaurus A, and he claims it is radiating strongly in the whole visible band now. He means strongly for him, with his eyes. I'm not sure I can see it at all. There *may* be a sort of very faint, diffuse glow there, like the *gegenschein,* but I'm not sure. Neither is anyone else.

But the starbow itself is beautiful. It's worth the trip. Flo has been learning oil painting so she can make a picture of it to send you for your wall, although when she found out what you'd been up to she got so sore she was thinking of boobytrapping it with a fusion bomb or something. (But she's over that now. I think.)

So we're not so mad at you any more, although there was a time when if I'd been communicating with you at exactly that moment I would have said some bad things.

I just played this back, and it sounds pretty jumbled and confused. I'm sorry about that. It's hard for me to do this. I don't mean hard like intellectually difficult—the way chess problems and tensor analysis used to be—but hard like shoveling sand with a teaspoon. I'm just not used to constricting my thoughts in this straitjacket any more. I tried to get one of the others to communicate this time, but there were no takers. I did get a lot of free advice. Dot says I shouldn't waste my time remembering how we used to talk. She wanted to write an eidetic account in simplified notation for you, which she estimated a crash program could translate for you in reasonable time, a decade or two, and would give you an absolutely full account of everything. I objected that that involved practical difficulties. Not in preparing the account . . . shucks, we can all do that now. I don't forget anything, except irrelevant things like the standard-reckoning day that I don't want to remember in the first place, and neither does anyone else. But the length of transmission would be too much. We don't have the power to transmit the necessary number of groups, especially since the accident. Dot said we could Gödelize it. I said you were too dumb to de-Gödelize it. She said it would be very good practice for you.

Well, she's right about that, and it's time you all learned how to communicate in a sensible way, so if the power holds out I'll include Dot's eidetic account at the end—in Gödelized form. Lots of luck. I won't honestly be surprised if you miss a digit or something and it all turns into "Rebecca of Sunnybrook Farm" or some missing books of apocrypha or, more likely of course, gibberish. Ski says it won't do you any good in any case, because Henle was right. I pass that on without comment.

Sex. You always want to hear about sex. It's great. Now that we don't have to fool with the pills any more we've been having some marvelous times. Flo and Jim Barstow began making it as part of a multiplexed communications system that you have to see to believe. Sometimes when they're going to do it we all knock off and just sit around and watch them, cracking jokes and singing and helping with the auxiliary computations. When we had that little bit of minor surgery the other day—now we've got the bones seasoning—Ann and Ski decided to ball instead of using anesthesia, and they said it was better than acupuncture. It didn't block the sensation. They were aware of their little toes being lopped off, but they didn't perceive it as pain. So then Jim, when it was his turn, tried going through the amputation without anything at all in the expectation that he and Flo would go to bed together a little later, and

that worked well too. He was all set up about it; claimed it showed a reverse causalty that his theories predicted but that had not been demonstrated before. Said at last he was over the cause-preceding-the-effect hangup. It's like the Red Queen and the White Queen, and quite puzzling until you get the hang of it. (I'm not sure I've got the hang of it yet.) Suppose he hadn't balled Flo? Would his toe have hurt retroactively? I'm a little mixed up on this, Dot says because I simply don't understand phenomenology in general, and I think I'll have to take Ann's advice and work my way through Carnap, although the linguistics are so poor that it's hard to stay with it. Come to think of it, I don't have to. It's all in the Gödelized eidetic statement, after all. So I'll transmit the statement to you, and while I'm doing it that will be a sort of review for me and maybe I'll get my head right on causality.

Listen, let me give you a tip. The statement will also include Ski's trick of containing plasma for up to 500K milliseconds, so when you figure it out you'll know how to build those fusion power reactors you were talking about when we left. That's the carrot before your nose, so get busy on de-Gödelizing. The plasma dodge works fine, although, of course, we were sorry about what happened when we junked those dumb Rube Goldberg bombs you had going off and replaced them with a nice steady plasma flow. The explosion killed Will Becklund outright, and it looked hairy for all of us.

Well, anyway. I have to cut this short because the power's running a little low and I don't want to chance messing up the statement. It follows herewith:

$1973^{354} + 331^{852} + 17^{2008} + 5^{47} + 3^{9606} + 2^{88}$ take away 78.

Lots of luck, fellows!

WASHINGTON FOUR

Knefhausen lifted his head from the litter of papers on his desk. He rubbed his eyes, sighing. He had given up smoking the same time as the President, but, like the President, he was thinking of taking it up again. It could kill you, yes. But it was a tension-reducer, and he needed that. And what was wrong with something killing you. There were worse things than being killed, he thought dismally.

Looking at it any way you could, he thought objectively, the past two or three years had been hard on him. They had started so well and had gone so bad. Not as bad as those distant memories of childhood when everybody was so poor and Berlin was so cold and what warm clothes he had came from the *Winterhilfe*. By no means as hard as the end of the war. Nothing like as bad as those first years in South America and then in the Middle East, when even the lucky and famous ones, the Von Brauns and the Ehrickes, were having trouble getting what was due them and a young calf like Knefhau-

sen had to peel potatoes and run elevators to live. But harder and worse than a man at the summit of his career had any reason to expect.

The Alpha-Aleph project, fundamentally, was sound! He ground his teeth, thinking about it. It would work no, by God, it *was* working, and it would make the world a different place. Future generations would see.

But the future generations were not here yet, and in the present things were going badly.

Reminded, he picked up the phone and buzzed his secretary. "Have you got through to the President yet?" he demanded.

"I'm sorry, Dr. Knefhausen. I've tried every ten minutes, just as you said."

"Ah," he grunted. "No, wait. Let me see. What calls are there?"

Rustle of paper. "The news services, of course, asking about the rumors again. Jack Anderson's office. The man from CBS."

"No, no. I will not talk to the press. Anyone else."

"Senator Copley called, asking when you were going to answer the list of questions his committee sent you."

"I will give him an answer. I will give him the answer Götz von Berlichingen gave to the Bishop of Bamberg."

"I'm sorry, Dr. Knefhausen, I didn't quite catch—"

"No matter. Anything else?"

"Just a long-distance call, from a Mr. Hauptmann. I have his number."

"Hauptmann?" The name was puzzlingly familiar. After a moment Knefhausen placed it: to be sure, the photo technician who had cooperated in the faked pictures from Briareus XII. Well, he had his orders to stay out of sight and shut up. "No, that's not important. None of them are, and I do not wish to be disturbed with such nonsense. Continue as you were, Mrs. Ambrose. If the President is reached you are to put me on at once, but no other calls."

He hung up and turned to his desk.

He looked sadly and fondly at the papers. He had them all out: the reports from the *Constitution*, his own drafts of interpretation and comment, and more than a hundred footnoted items compiled by his staff, to help untangle the meanings and implications of those ah, sometimes so cryptic reports from space:

"*Henle.* Apparently refers to Paul Henle (note appended); probably the citation intended is his statement, 'There are certain symbolisms in which certain things cannot be said.' Conjecture that English language is one of those symbolisms."

"*Orange sherbet sundae.* A classified experimental study was made of the material in Document Ref. No. CON-130, Para. 4. Chemical analysis and experimental testing have indicated that the recommended mixture of pharmaceuticals and other ingredients produce a hallucinogen-

related substance of considerable strength and not wholly known qualities. One hundred subjects ingested the product or a placebo in a double-blind controlled test. Subjects receiving the actual substance report reactions significantly different from the placebo. Effects reported include feelings of immense competence and deepened understanding. However, data is entirely subjective. Attempts were made to verify claims by standard I.Q., manipulative and other tests, but the subjects did not cooperate well and several have since absented themselves without leave from the testing establishment."

"*Gödelized language.* A system of encoding any message of any kind as a single very large number. The message is first written out in clear language and then encoded as bases and exponents. Each letter of the message is represented in order by the natural order of primes—that is, the first letter is represented by the base 2, the second by the base 3, the third by the base 5, then 7, 11, 13, 17, et cetera. The identity of the letter occupying that position in the message is given by the exponent: simply, the exponent 1 meaning that the letter in that position is an A, the letter 2 meaning that it is a B, 3 a C, et cetera. The message, as a whole, is then rendered as the product of all the bases and exponents. *Example.* The word "cab" can thus be represented as $2^3 \times 3^1 \times 5^2$, or 600. (=8x3x25.) The name 'Abe' would be represented by the number 56,250, or $2^1 \times 3^2 \times 5^5$. (=2x9x3125.) A sentence like 'John lives' would be represented by the product of the following terms: $2^{10} \times 3^{15} \times 5^8 \times 7^{14} \times 11^0 \times 13^{12} \times 17^9 \times 19^{22} \times 23^5 \times 29^{19} \times 31^{27}$—in which the exponent '0' has been reserved for a space and the exponent '27' has been arbitrarily assigned to indicate a full stop. As can be seen, the Gödelized form for even a short message involves a very large number, although such numbers may be transmitted quite compactly in the form of a sum of bases and exponents. The example transmitted by the *Constitution*is estimated to equal the contents of a standard unabridged dictionary."

"*Farsight.* The subject James Madison Barstow is known to have suffered from some nearsightedness in his early school years, apparently brought on by excessive reading, which he attempted to cure through eye exercises similar to the 'Bates method'—note appended. His vision at time of testing for Alpha-Aleph project was optimal. Interviews with former associates indicate his continuing interest in increasing visual acuity. *Alternate explanation.*There is some indication that he was also interested in paranormal phenomena such as clairvoyance or prevision, and it is possible, though at present deemed unlikely, that his use of the term refers to 'looking ahead' in time."

And so on, and on.

Knefhausen gazed at the litter of papers lovingly and hopelessly, and

passed his hand over his forehead. The kids! They were so marvelous . . . but so unruly . . . and so hard to understand. How unruly of them to have concealed their true accomplishments. The secret of hydrogen fusion! That alone would justify, more than justify, the entire project. But where was it? Locked in that number-jumber gibberish. Knefhausen was not without appreciation of the elegance of the method. He, too, was capable of taking seriously a device of such luminous simplicity. Once the number was written out you had only to start by dividing it by two as many times as possible, and the number of times would give you the first letter. Then divide by the next prime, three, and that number of times would give you the second letter. But the practical difficulties! You could not get even the first letter until you had the whole number, and IBM had refused even to bid on constructing a bank of computers to write that number out unless the development time was stretched to twenty-five years. *Twenty-five years.* And meanwhile in that number was hidden probably the secret of hydrogen fusion, possibly many greater secrets, most certainly the key to Knefhausen's own well being over the next few weeks. . .

His phone rang.

He grabbed it and shouted into it at once: "Yes, Mr. President!"

He had been too quick. It was only his secretary. Her voice was shaking but determined.

"It's not the President, Dr. Knefhausen, but Senator Copley is on the wire and he says it is urgent. He says—"

"No!" shouted Knefhausen and banged down the phone. He regretted it even as he was doing it. Copley was very high, chairman of the Armed Forces Committee; he was not a man Knefhausen wished to have as an enemy, and he had been very careful to make him a friend over years of patient fence-building. But he could not speak to him, or to anyone, while the President was not answering his calls. Copley's rank was high, but he was not in the direct hierarchical line over Knefhausen.When the top of that line refused to talk to him Knefnausen was cut off from the world.

He attempted to calm himself by examining the situation objectively. The pressures on the President just now: they were enormous. There was the continuing trouble in the cities, all the cities. There were the political conventions coming up. There was the need to get elected for a third term, and the need to get the law amended to make that possible. And yes, Knefhausen admitted to himself, the worst pressure of all was the rumors that were floating around about the *Constitution.* He had warned the President. It was unfortunate the President had not listened. He had said that a secret known to two people is compromised and a secret known to more than two is no secret. But the

President had insisted on the disclosure to that ever-widening circle of high officials—sworn, of course, to secrecy, but what good was that? In spite of everything, there had been leaks. Fewer than one might have feared. More than one could stand.

He touched the reports from *Constitution* caressingly. Those beautiful kids, they could still make everything right, so wonderful. . .

Because it was he who had made them wonderful, he confessed to himself. He had invented the idea. He had selected them. He had done things which he did not quite even yet reconcile himself to to make sure that it was they and not some others who were on the crew. He had, above all, made doubly sure by insuring their loyalty in every way possible. Training. Discipline. Ties of affection and friendship. More reliable ties: loading their food supplies, their entertainment tapes, their programmed activities with every sort of advertising inducement, M/R compulsion, psychological reinforcement he could invent or find, so that whatever else they did they did not fail to report faithfully back to Earth. Whatever else happened, there was that. The data might be hard to entangle, but would be there. They could not help themselves; his commandments were stronger than God's; like Martin Luther they must say *Ich kann nicht anders,* and come Pope or Inquisition they must stand by it. They would learn, and tell what they learned, and thus the investment would be repaid. . .

The telephone!

He was talking before he had it even to his mouth. "Yes, yes! This is Dr. Knefhausen, yes!" he gabbled. Surely it must be the President now—

It was not.

"Knefhausen!" shouted the man on the other end. "Now, listen, I'll tell you what I told that bitch pig girl of yours, if I don't talk to you on the phone *right now* I'll have Fourth Armored in there to arrest you and bring you to me in twenty minutes. So listen!"

Knefhausen recognized both voice and style. He drew a deep breath and forced himself to be calm. "Very well, Senator Copley," he said, "what is it?"

"The game is blown, boy! That's what it is. That boy of yours in Huntsville, what's his name, the photo technician—"

"Hauptmann?"

"That's him! Would you like to know where he is, you dumb Kraut bastard?"

"Why, I suppose . . . I should think in Huntsville—"

"Wrong, boy! Your Kraut bastard friend claimed he didn't feel good and took some accrued sick time. Intelligence kept an eye on him up to a point, didn't stop him, wanted to see what he'd do. Well, they saw. They saw him leaving Orly Airport an hour ago in an Aeroflot plane. Put your brain to work on that one, Knefhausen! He's defected. Now

start figuring out what you're going to do about it, and it better be good?"

Knefhausen said something, he did not know what, and hung up the phone, he did not remember when. He stared glassily into space for a time.

Then he flicked the switch for his secretary and said, not listening to her stammering apologies, "That long-distance call that came from Hauptmann before, Mrs. Ambrose. You didn't say where it was from."

"It was an overseas call, Dr. Knefhausen. From Paris. You didn't give me a chance to–"

"Yes, yes. I understand. Thank you. Never mind." He hung up and sat back. He felt almost relieved. If Hauptmann had gone to Russia it could only be to tell him that the picture was faked and not only was there no planet for the astronauts to land on but it was not a mistake, even, actually a total fraud. So now it was all out of his hands. History would judge him now. The die was cast. The Rubicon was crossed.

So many literary allusions, he thought deprecatingly. Actually it was not the judgment of history that was immediately important but the judgment of certain real people now alive and likely to respond badly. And they would judge him not so much by what might be or what should have been, as by what was. He shivered in the cold of that judgment, and reached for the telephone to try once more to call the President. But he was quite sure the President would not answer, then or ever again.

CONSTITUTION FIVE

Old reliable P.O.'d Shef here. Look, we got your message. I don't want to discuss it. You've got a nerve. You're in a bad mood, aren't you? If you can't say anything nice, don't say anything at all. We do the best we can, and that's not bad, and if we don't do exactly what you want us to maybe it's because we know quite a lot more than you did when you fired us off at that blob of moonshine you call Alpha-Aleph. Well, thanks a lot for nothing.

On the other hand, thanks a little for what you did do, which at least worked out to get us where we are, and I don't mean spatially. So I'm not going to yell at you. I just don't want to talk to you at all. I'll let the others talk for themselves.

Dot Letski speaking. This is important. Pass it on. I have three things to tell you that I do not want you to forget. *One: Most problems have grammatical solutions.* The problem of transporting people from Earth to another planet does not get solved by putting pieces of steel together one at a time at random, and happening to find out you've built the *Constitution* by accident. It gets solved by constructing a model–=equation (=grammar)–which describes the necessary circumstances under which the transportation occurs. Once you have the grammatical

model, you just put the metal around it and it goes like gangbusters.

When you have understood this you will be ready for: *Two: There is no such thing as causality.* What a waste of time it has been, trying to assign "causes" to "events"! You say things like, "Striking a match causes it to burn." True statement? No, false statement. You find yourself in a whole waffle about whether the "act" of "striking" is "necessary" and/or "sufficient" and you get lost in words. Pragmatically useful grammars are without tenses. In a decent grammar—which this English-language one, of course, is not, but I'll do the best I can—you can make a statement like "There exists a conjunction of forms of matter —specified—which combine with the release of energy at a certain temperature—which may be the temperature associated with heat of friction." Where's the causality? "Cause" and "effect" are in the same timeless statement. So, *Three: There are no such things as empirical laws.* Ski came to understand that he was able to contain the plasma in our jet indefinitely, not by pushing particles around in brute-force magnetic squeezes, but by encouraging them to want to stay together. There are other ways of saying what he does—="creates an environment in which centripetal exceed centrifugal forces"—, but the way I said it is better because it tells something about your characters. Bullies, all of you. Why can't you be nice to things if you want them to be nice to you? Be sure to pass this on to T'in Fa at Tientsin, Professor Morris at All Soul's and whoever holds the Carnap chair at UCLA.

Flo's turn. My mother would have loved my garden. I have drumsticks and daffodils growing side by side in the sludgy sand. They do so please us, and we them! I will probably transmit a full horticultural handbook at a future date, but meanwhile it is shameful to eat a radish. Carrots, on the other hand, enjoy it.

A statement of William Becklund, deceased. I emerged into the world, learned, grew, ate, worked, moved and died. Alternatively, I emerged from the hydrogen flare, shrank, disgorged and reentered the womb one misses so. You may approach it from either end, it makes no difference at all which way you look at it.

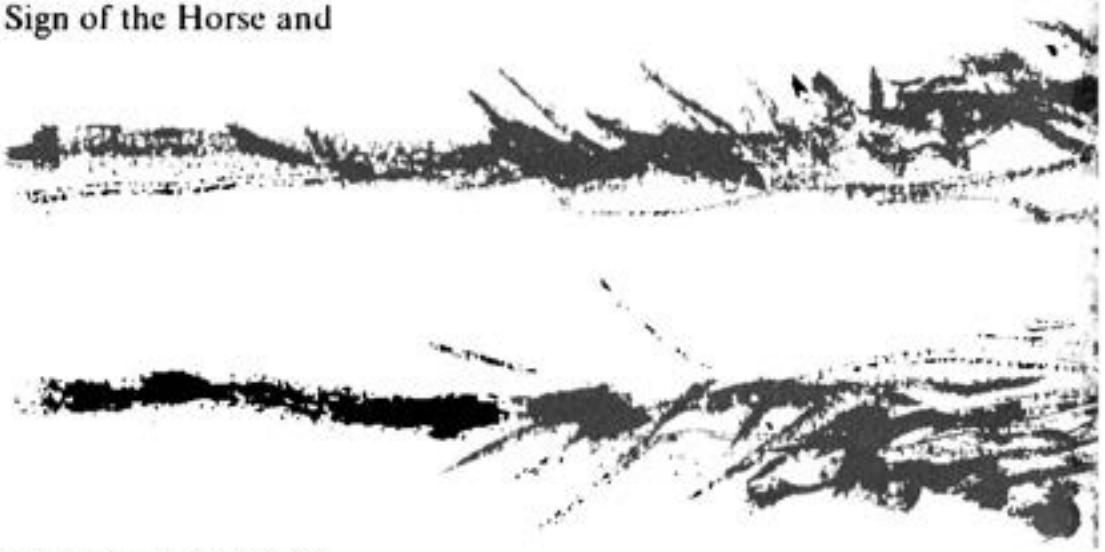
Observational datum, Letski. At time t, a Dirac number incommensurable with GMT, the following phenomenon is observed:

The radio source Centaurus A is identified as a positionally stable single collective object rather than two intersecting gas clouds and is observed to contract radially toward a center. Analysis and observation reveal it to be a Black Hole of which the fine detail is not detectable as yet. One infers all galaxies develop such central vortices, with implications of interest to astronomers and eschatologists. I, Seymour Letski,

propose to take a closer look but the others prefer to continue programmed flight first. Harvard-Smithsonian notification service, please copy.

"Starbow," a preliminary study for a rendering into English of a poem by James Barstow:

Gaggle of goslings but pick of our race
We waddle through relativistic space.
Dilated, discounted, despondent we scan:
But vacant the Sign of the Horse and the Man.

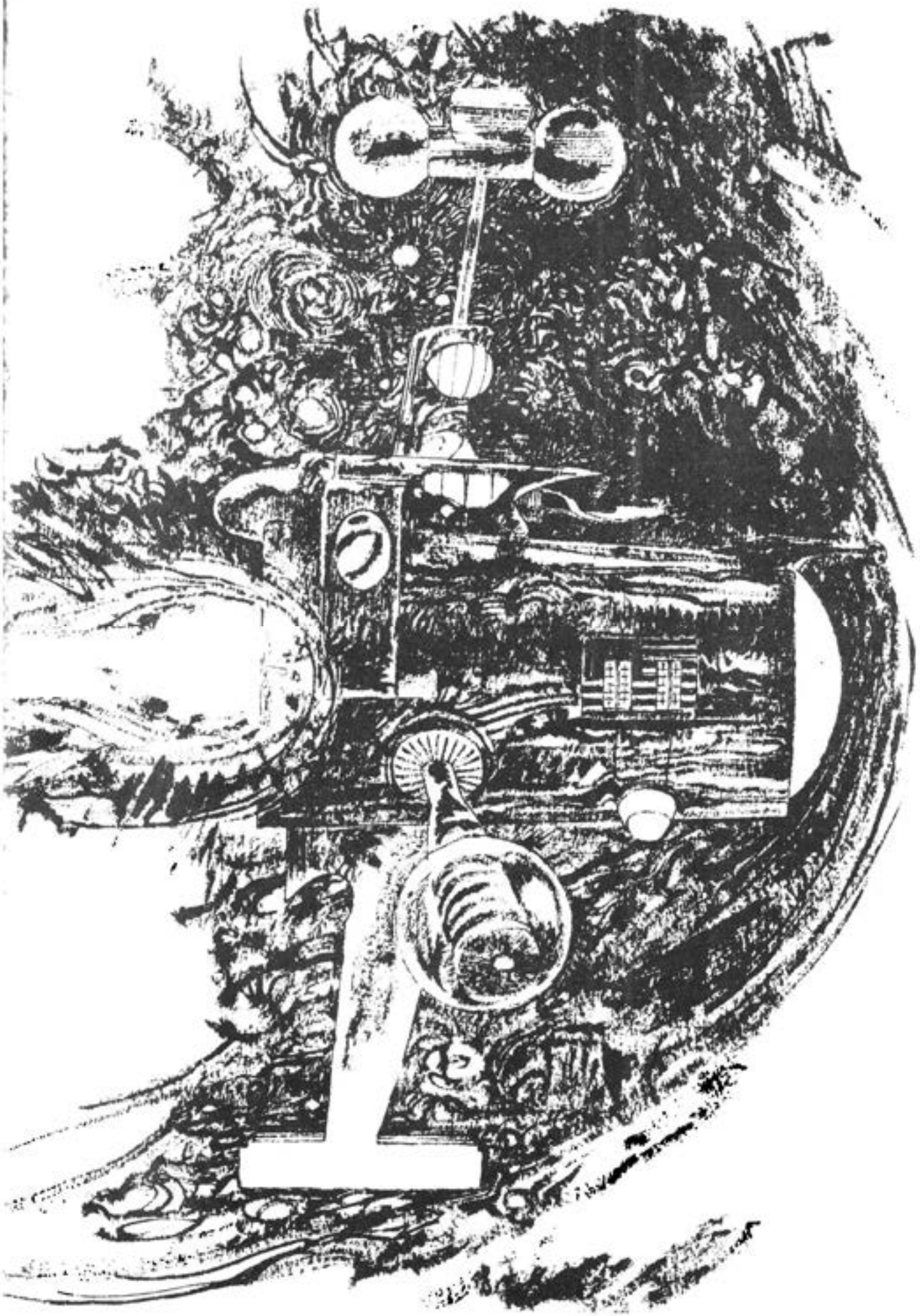


Vacant the Sign of the Man and the Horse,
And now we conjecture the goal of our course.
Tricked, trapped and cozened, we ruefully run
After the child of the bachelor sun.
The trick is revealed and the trap is confessed
And we are the butts of the dim-witted jest.
O Gander who made us, O Goose who laid us,
How lewdly and twistedly you betrayed us!
We owe you a debt. We won't forget.
With fortune and firmness we'll pay you yet.
Give us some luck and we'll timely send
Your pot of gold from the starbow's end.

Ann Becklund:

I think it was Stanley Weinbaum who said that from three facts a truly superior mind should be able to deduce the whole universe. (Ski thinks it is possible with a finite number, but considerably larger than that). We are so very far from being truly superior minds by those standards, or even by our own. Yet we have a much larger number of facts to work with than three, or even three thousand, and so we have deduced a good deal.

This is not as valuable to you as



you might have hoped, dear old bastardly Kneffie and all you bastardly others, because one of the things that we have deduced is that we can't tell you everything, because you wouldn't understand. We could help you along, some of you, if you were here, and in time you would be able to do what we do easily enough, but not by remote control.

But all is not lost, folks! Cheer up! You don't deduce like we deduce, but on the other hand you have so very much more to work from. Try. Get smart. You can do it if you want to. Set your person at rest, compose your mind before you speak, make your relations firm before you ask for something. Try not to be loathsome about it. Don't be like the fellow in the Changes. "He brings increase to no one. Indeed, someone even strikes him."

We've all grown our toes back now, even Will, although it was particularly difficult for him since he had been killed, and we've inscribed the bones and used them with very good effect in generating the hexagrams. I hope you see the point of what we did. We could have gone on with tossing coins or throwing the yarrow stalks, or at least with the closest Flo could breed to yarrow stalks. We didn't want to do that because it's not the optimum way.

The person who doesn't keep his heart constantly steady might say, "Well, what's the difference?" That's a poor sort of question to ask. It implies a deterministic answer. A better question is, "Does it make a difference?", and the answer to that is, "Yes, probably, because in order to do something right you must do it right." That is the law of identity, in any language.

Another question you might ask is, "Well, what source of knowledge are you actually tapping when you consult the hexagrams?" That's a better kind of question in that it doesn't *force* a wrong answer, but the answer is, again, indeterminate. You might view the *I Ching* as a sort of Rorschach bundle of squiggles that has no innate meaning but is useful because your own mind interprets it and puts sense into it. Feel free! You might think of it as a sort of memory bank of encoded lore. Why not? You might skip it entirely and come to knowledge in some other tao, any tao you like. ("The superior man understands the transitory in the light of the eternity of the end.") That's fine, too!

But whatever way you do it, you should *do* it that way. We needed inscribed bones to generate hexagrams, because that was the right way, and so it was no particular sacrifice to lop off a toe each for the purpose. It's working out nicely, except for one thing. The big hangup now is that the translations are so degraded, Chinese to German, German to English and error seeping in at every step, but we're working on that now.

Perhaps I will tell you more at another time. Not now. Not very

soon. Eve will tell you about that.

Eve Barstow, the Dummy, comes last and, I'm afraid, least.

When I was a little girl I used to play chess, badly, with very good players, and that's the story of my life. I'm a chronic over-achiever. I can't stand people who aren't smarter and better than I am, but the result is that I'm the runt of the litter every time. They are all very nice to me here, even Jim, but they know what the score is and so do I.

So I keep busy and applaud what I can't do. It isn't a bad life. I have everything I need, except pride.

Let me tell you what a typical day is like here between Sol and Centaurus. We wake up–if we have been sleeping, which some of us still do–and eat–if we are still eating, as all but Ski and, of course, Will Becklund do. The food is delicious and Florence has induced it to grow cooked and seasoned where that is desirable, so it's no trouble to go over and pick yourself a nice poached egg, or clutch of French fries. (I really prefer brioche in the mornings, but for sentimental reasons she can't manage it.) Sometimes we ball a little or sing old campfire songs. Ski comes down for that, but not for long, and then he goes back to looking at the universe. The starbow is magnificent and appalling. It is now a band about 40° across, completely surrounding us with colored light. One can always look in the other frequencies and see ghost stars before us and behind us, but in the birthright bands the view to the front and rear is now dead black and the only light is that beautiful banded ring of powdery stars.

Sometimes we write plays or have a little music. Shef had deduced four lost Bach piano concerti, very reminiscent of Corelli and Vivaldi, with everything going at once in the tuttis, and we've all adapted them for performance. I did mine on the Moog, but Ann and Shef synthesized whole orchestras. Shef's is particularly cute. You can tell that the flautist has early emphysema and two people in the violin section have been drinking, and he's got Toscanini conducting like a *risorgimento* metronome. Flo's oldest daughter made up words and now she sings a sort of nursery rhyme adaptation of some Buxtehude chorales; oh, I didn't tell you about the kids. We have eleven of them now. Ann, Dot and I have one apiece, and Florence has eight. (But they're going to let me have quadruplets next week.) They let me take care of them pretty much for the first few weeks, while they're little, and they're *so* darling.

So mostly I spend my time taking care of the kids and working out tensor equations that Ski kindly gives me to do for him, and, I must confess it, feeling a little lonely. I *would* like to watch a TV quiz show over a cup of coffee with a friend! They let me do over the interior of our mobile home now and then. The other day I redid it in Pittsburgh suburban as a

joke. Would you believe French windows in interstellar space? We never open them, of course, but they look real pretty with the chintz curtains and lace tiebacks. And we've added several new rooms for the children and their pets. (Flo grew them the cutest little bunnies in the hydroponics plot).

Well, I've enjoyed this chance to gossip, so will sign off now. There is one thing I have to mention. The others have decided we don't want to get any more messages from you. They don't like the way you try to work on our subconsciouses and all—not that you succeed, of course, but you can see that it's still a little annoying—, and so in future the dial will be set at six-six-oh, all right, but the switch will be in the "off" position. It wasn't my idea, but I was glad to go along. I *would* like some slightly less demanding company from time to time, although not, of course, yours.

WASHINGTON FIVE

Once upon a time the building that was now known as DoD Temp Restraining Quarters 7—you might as well call it with the right word, "jail", Knefhausen thought—had been a luxury hotel in the Hilton chain. The maximum security cells were in the underground levels, in what had been meeting rooms. There were no doors or windows to the outside. If you did get out of your own cell you had a flight of stairs to get up before you were at ground level, and then the guards to break through to get to the open. And then, even if there happened not to be an active siege going on at the moment, you took your chances with the roaming addicts and activists outside.

Knefhausen did not concern himself with these matters. He did not think of escape, or at least didn't after the first few panicky moments, when he realized he was under arrest. He stopped demanding to see the President after the first few days. There was no point in appealing to the White House for help when it was the White House that had put him here. He was still sure that if only he could talk to the President privately for a few moments he could clear everything up. But as a realist he had faced the fact that the President would never talk to him privately again.

So he counted his blessings.

First, it was comfortable here. The bed was good, the rooms were warm. The food still came from the banquet kitchens of the hotel, and it was remarkably good for jailhouse fare.

Second, the kids were still in space and still doing some things, great things, even if they did not report what. His vindication was still a prospect.

Third, the jailers let him have newspapers and writing materials, although they would not bring him his books, or give him a television set.

He missed the books, but nothing

else. He didn't need TV to tell him what was going on outside. He didn't even need the newspapers, ragged, thin and censored as they were. He could hear for himself. Every day there was the rattle of small-arms fire, mostly far-off and sporadic, but once or twice sustained and heavy and almost overhead, Brownings against AK-47s, it sounded like, and now and then the slap and smash of grenade launchers. Sometimes he heard sirens hooting through the streets, punctuated by clanging bells, and wondered that there was still a civilian fire department left to bother. (Or was it still civilian?) Sometimes he heard the grinding of heavy motors that had to be tanks. The newspapers did little to fill in the details, but Knefhausen was good at reading between the lines. The Administration was holed up somewhere—Key Biscayne, or Camp David, or Southern California, no one was saying where. The cities were all in red revolt. *Herr Omnes* had taken over.

For these disasters Knefhausen felt unjustly blamed. He composed endless letters to the President, pointing out that the serious troubles of the Administration had nothing to do with Alpha-Aleph; the cities had been in revolt for most of a generation, the dollar had become a laughingstock since the Indochinese wars. Some he destroyed, some he could get no one to take from him, a few he managed to dispatch—and got no answers.

Once or twice a week a man from the Justice Department came to ask him the same thousand pointless questions once again. They were trying to build up a dossier to prove it was all his fault, Knefhausen suspected. Well, let them. He would defend himself when the time came. Or history would defend him. The record was clear. With respect to moral issues, perhaps, not so clear, he conceded. No matter. One could not speak of moral questions in an area so vital to the search for knowledge as this. The dispatches from the *Constitution* had already produced so much—although, admittedly, some of the most significant parts were hard to understand. The Gödel message had not been unscrambled, and the hints of its contents remained only hints.

Sometimes he dozed and dreamed of projecting himself to the *Constitution*. It had been a year since the last message. He tried to imagine what they had been doing. They would be well past the midpoint now, decelerating. The starbow would be broadening and diffusing every day. The circles of blackness before and behind them would be shrinking. Soon they would see Alpha Centauri as no man had ever seen it. To be sure, they would then see that there was no planet called Aleph circling the primary, but they had guessed that somehow long since. Brave, wonderful kids! Even so they had gone on. This foolishness with drugs and sex, what of it? One

opposed such goings-on in the common run of humanity, but it had always been so that those who excelled and stood out from the herd could make their own rules. As a child he had learned that the plump, proud air leader sniffed cocaine, that the great warriors took their sexual pleasure sometimes with each other. And intelligent man did not concern himself with such questions, which was one more indication that the man from the Justice Department, with his constant hinting and prying into Knefhausen's own background, was not really very intelligent.

The good thing about the man from the Justice Department was that one could sometimes deduce things from his questions, and rarely, oh, very rarely, he would sometimes answer a question himself. "Has there been a message from the *Constitution?*" "No, of course not, Dr. Knefhausen. Now, tell me again, who suggested this fraudulent scheme to you in the first place?"

Those were the highlights of his days, but mostly the days just passed unmarked.

He did not even scratch them off on the wall of his cell, like the prisoner in the Chateau d'If. It would have been a pity to mar the hardwood paneling. Also he had other clocks and calendars. There was the ticking of the arriving meals, the turning of the seasons as the man from the Justice Department paid his visits. Each of these was like a holiday—a holy day, not joyous but solemn. First there would be a visit from the captain of the guards with two armed soldiers standing in the door. They would search his person and his cell on the chance that he had been able to smuggle in a . . . a what? A nuclear bomb, maybe. Or a pound of pepper to throw in the Justice man's eyes. They would find nothing, because there was nothing to find. And then they would go away and for a long time there would be nothing. Not even a meal, even if a meal time happened to be due. Nothing at all, until an hour or three hours later the Justice man would come in with his own guard at the door, equally vigilant inside and out, and his engineer manning the tape recorders, and his questions.

And then there was the day when the man from the Justice Department came and he was not alone. With him was the President's secretary, Murray Amos.

How treacherous is the human heart! When it has given up hope how little it takes to make it hope again!

"Murray!" cried Knefhausen, almost weeping, "it's so good to see you again! The President, is he well? What can I do for you? Have there been developments?"

Murray Amos paused in the doorway. He looked at Dieter von Knefhausen and said bitterly, "Oh, yes, there have been developments. Plenty of them. The Fourth Armored has just changed sides, so we

are evacuating Washington. And the President wants you out of here at once."

"No, no! I mean . . . oh, yes, it is good that the President is concerned about my welfare, although it is bad about the Fourth Armored. But what I mean, Murray, is this: Has there been a message from the *Constitution?*"

Amos and the Justice Department man looked at each other. "Tell me, Dr. Knefhausen," said Amos silkily, "how did you manage to find that out?"

"Find it out? How could I find it out? No, I only asked because I hoped. There has been a message, yes? In spite of what they said? They have spoken again?"

"As a matter of fact, there has been," said Amos thoughtfully. The Justice Department man whispered piercingly in his ear, but Amos shook his head. "Don't worry, we'll be coming in a second. The convoy won't go without us . . . Yes, Knefhausen, the message came through to Goldstone two hours ago. They have it at the decoding room now."

"Good, very good!" cried Knefhausen. "You will see, they will justify all. But what do they say? Have you good scientific men to interpret it? Can you understand the contents?"

"Not exactly," said Amos, "because there's one little problem the code room hadn't expected and wasn't prepared for. The message wasn't coded. It came in clear, but the language was Chinese."

CONSTITUTION SIX

Ref.: CONSIX T51/11055/*7

CLASSIFIED MOST SECRET

Subject: Transmission from U.S. Starship *Constitution.*

The following message was received and processed by the decrypt section according to standing directives. Because of its special nature, an investigation was carried out to determine its provenance. Radio-direction data received from Farside Base indicate its origin along a line of sight consistent with the present predicted location of the *Constitution.* Strength of signal was high but within appropriate limits, and degradation of frequency separation was consistent with relativistic shifts and scattering due to impact with particle and gas clouds.

Although available data do not prove beyond doubt that this transmission originated with the starship, no contra-indications were found.

On examination, the text proved to be a phonetic transcription of what appears to be a dialect of Middle Kingdom Mandarin. Only a partial translation has been completed. (See note appended to text.) The translation presented unusual difficulties for two reasons: One, the difficulty of finding a translator of sufficient skill who could be granted appropriate security status; two, because—conjecturally—the language used may not correspond exactly to

any dialect but may be an artifact of the *Constitution's* personnel. (See PARA EIGHT.)

This text is PROVISIONAL AND NOT AUTHENTICATED and is furnished only as a first attempt to translate the contents of the message into English. Efforts are being continued to translate the full message, and to produce a less corrupt text for the section herewith. Later versions and emendations will be forwarded when available.

TEXT FOLLOWS:

PARA ONE. The one who speak for all—*Lt-Col Sheffield H Jackman*—rests. With righteous action comes surcease from care. I—*identity not certain, but probably Mrs. Annette Marin Becklund, less probably one of the other three female personnel aboard, or one of their descendants*—come in his place, moved by charity and love.

PARA TWO. It is not enough to study or to do deeds which make the people frown and bow their heads. It is not enough to comprehend the nature of the sky or the sea. Only through the understanding of all can one approach wisdom, and only through wisdom can one act rightly.

PARA THREE. These are the precepts as it is given us to see them:

PARA FOUR. The one who imposes his will by force lacks justice. Let him be thrust from a cliff.

PARA FIVE. The one who causes another to lust for a trifle of carved wood or a sweetmeat lacks courtesy. Let him be restrained from the carrying out of wrong practices.

PARA SIX. The one who ties a knot and says, "I do not care who must untie it," lacks foresight. Let him wash the ulcers of the poor and carry nightsoil for all until he learns to see the day to come as brother to the day that is.

PARA SEVEN. We who are in this here should not impose our wills on you who are in that here by force. Understanding comes late. We regret the incident of next week, for it was done in haste and in error. The one who speaks for all acted without thinking. We who are in this here were sorry for it afterward.

PARA EIGHT. You may wonder—*literally: ask thoughtless questions of the hexagrams*—why we are communicating in this language. The reason is in part recreational, in part heuristic—*literally: because on the staff hand one becomes able to strike a blow more ably when blows are struck repeatedly*—but the nature of the process is such that you must go through it before you can be told what it is. Our steps have trodden this path. In order to reconstruct the Chinese of the *I Ching* it was first necessary to reconstruct the German of the

translation from which the English was made. Error lurks at every turn. [*Literally: false apparitions shout at one each time the path winds.*] Many flaws mark our carving. Observe it in silence for hours and days until the flaws become part of the work.

PARA NINE. It is said that you have eight days before the heavier particles arrive. The dead and broken will be few. It will be better if all airborne nuclear reactors are grounded until the incident is over.

PARA TEN. When you have completed rebuilding send us a message, directed to the planet Alpha-Aleph. Our home should be prepared by then. We will send a ferry to help colonists across the stream when we are ready:

The above text comprises the first 852 groups of the transmission. The remainder of the text, comprising approximately 7,500 groups, has not been satisfactorily translated. In the opinion of a consultant from the Oriental Languages Department at Johns Hopkins it may be a poem.

/s/Durward S. RICHTER

Durward S. RICHTER
Major General, USMC
Chief Cryptographer
Commanding

Distribution: X X X
BY HAND ONLY

WASHINGTON SIX

The President of the United States—Washington—opened the storm window of his study and leaned out to yell at his Chief Science Adviser. "Harry, get the lead out! We're waiting for you!"

Harry looked up and waved, then continued doggedly plowing through the dripping jungle that was the North Lawn. Between the overgrown weeds and the rain and the mud it was slow going, but the President had little sympathy. He slammed down the window and said, "That man, he just goes out of his way to aggravate me. How long am I supposed to wait for him so I can decide if we have to move the capital or not?"

The Vice President looked up from her knitting. "Jimbo, honey, why do you fuss yourself like that? Why don't we just move and get it over with?"

"Well, it looks so lousy." He threw himself into a chair despondently. "I was really looking forward to the Tenth Anniversary parade," he complained. "Ten years, that's really worth bragging about! I don't want to hold it out in the sticks, I want it right down Constitution Avenue, just like the old days, with the people cheering and the reporters and the cameras all over and everything. Then let that son of a bitch in Omaha say I'm not the real President."

His wife said placidly, "Don't fuss yourself about him, honey. You

know what I've been thinking, though? The parade might look a little skimpy on Constitution Avenue anyway. It would be real nice on a kind of littler street."

"Oh, what do you know? Anyway, where would we go? If Washington's under water, what makes you think Bethesda would be any better?"

His Secretary of State put down his solitaire cards and looked interested. "Doesn't have to be Bethesda," he said. "I got some real nice land up near Dulles we could use. It's high there."

"Why, sure. Lots of nice land over to Virginia," the Vice President confirmed. "Remember when we went out on that picnic after your Second Inaugural? That was at Fairfax Station. There were hills all around. Just beautiful."

The President slammed his fist on the coffee table and yelled, "I'm not the President of Fairfax Station, I'm the President of the U. S. of A.! What's the capital of the U. S. of A.? Washington! My God, don't you see how those jokers in Houston and Omaha and Salt Lake and all would laugh if they heard I had to move out of my own capital?"

He broke off, because his Chief Science Adviser was coming in the door, shaking himself, dripping mud as he got out of his oilskin slicker. "Well?" demanded the President. "What did they say?"

Harry sat down. "It's terrible out there. Anybody got a dry cigarette?"

The President threw him a pack. Harry dried his fingers on his shirt front before he drew one out. "Well," he said, "I went to every boat captain I could find. They all said the same. Ships they talked to, places they'd been. All the same. Tides rising all up and down the coast."

He looked around for a match. The President's wife handed him a gold cigarette lighter with the Great Seal of the United States on it, which, after some effort, he managed to ignite. "It don't look good, Jimmy. Right now it's low tide and that's all right, but it's coming in. And tomorrow it'll come in a little higher. And there will be storms—not just rain like this. I mean, you got to figure on a tropical depression coming up from the Bahamas now and then."

"We're not in the tropics," said the Secretary of State suspiciously.

"It doesn't mean that," said the Science Adviser, who had once given the weather reports over the local ABC television station, when there was such a thing as a television network. "It means storms. Hurricanes. But they're not the worst things, it's the tide. If the ice is melting, then they're going to keep getting higher regardless."

The President drummed his fingers on the coffee table. Suddenly he shouted, "I don't *want* to move my capital!"

No one answered. His temper outbursts were famous. The Vice President became absorbed in her knit-

ting, the Secretary of State picked up his cards and began to shuffle, the Science Adviser picked up his slicker and carefully hung it on the back of a door.

The President said, "You got to figure it this way. If we move out, then all those local yokels that claim to be the President of the United States are going to be just that much better off, and the eventual reunification of our country is going to be just that much more delayed." He moved his lips for a moment, then burst out, "I don't ask anything for myself! I never have. I only want to play the part I have to play in what's good for all of us, and that means keeping up my position as the *real* President, according to the U. S. of A. Constitution as amended. And that means I got to stay right here in the real White House, no matter what."

His wife said hesitantly, "Honey, how about this? The other Presidents had like a summer White House—Camp David and like that. Nobody fussed about it. Why couldn't you do the same as they did? There's the nicest old farmhouse out near Fairfax Station that we could fix up to be real pretty."

The President looked at her with surprise. "Now, that's good thinking," he declared. "Only we can't move permanently, and we have to keep this place garrisoned so nobody else will take it away from us, and we have to come back here once in a while. How about that, Harry?

His Science Adviser said thoughtfully, "We could rent some boats, I guess. Depends. I don't know how high the water might get."

"No 'guess'! No 'depends'! That's a national priority. We have to do it that way to keep that bastard in Omaha paying attention to the real President."

"Well, Jimbo, honey," said the Vice President after a moment, emboldened by his recent praise, "you have to admit they don't pay a lot of attention to us right now. When was the last time they paid their taxes?"

The President looked at her foxily over his glasses. "Talking about that," he said, "I might have a little surprise for them anyway. What you might call a secret weapon."

"I hope it does better than we did in the last war," said his wife, "because if you remember, when we started to put down the uprising in Frederick, Maryland, we got the pee kicked out of us."

The President stood up, indicating the Cabinet meeting was over.

"Never mind," he said sunnily. "You go on out again, Harry, and see if you can find any good maps in the Library of Congress where they got the fires put out. Find us a nice high place within, um, twenty miles if you can. Then we'll get the Army to condemn us a Summer White House like Mae says, and maybe I can sleep in a bed that isn't moldy for a change."

His wife looked worried, "What are you going to do, Jim?"

He chuckled. "I'm going to check out my secret weapon."

He shooed them out of his study and, when they were gone, went to the kitchen and got himself a bottle of Fresca from the six-pack in the open refrigerator. It was warm, of course. The Marine guard company was still trying to get the gas generator back in operation, but they were having little success. The President didn't mind. They were his personal Praetorians and, if they lacked a little as appliance repairmen, they had proved their worth when the chips were down. The President was always aware that during the Troubles he had been no more than any other Congressman—appointed to fill a vacancy, at that—and his rapid rise to Speaker of the House and Heir Apparent, finally to the Presidency itself, was due not only to his political skills and knowhow but also to the fact that he was the only remotely legitimate heir to the Presidency who also happened to have a brother-in-law commanding the Marine garrison in Washington.

The President was, in fact, quite satisfied with the way the world was going. If he envied Presidents of the past—missiles, fleets of nuclear bombers, billions of dollars to play with—he certainly saw nothing, when he looked at the world around him, to compare with his own stature in the real world he lived in.

He finished the soda, opened his study door a crack and peered out. No one was nearby. He slipped out and down the back stairs. In what had once been the public parts of the White House you could see the extent of the damage more clearly. After the riots and the trashings and the burnings and the coups the will to repair and fix up had gradually dwindled away. The President didn't mind. He didn't even notice the charred walls and the fallen plaster. He was listening to the sound of a distant gasoline pump chugging away, and smiling to himself as he approached the underground level where his secret weapon was locked up.

The secret weapon, whose name was Dieter von Knefhausen, was trying to complete the total defense of every act of his life that he called his memoirs.

He was less satisfied with the world than the President. He could have wished for many changes. Better health, for one thing; he was well aware that his essential hypertension, his bronchitis and his gout were fighting the last stages of a total war to see which would have the honor of destroying their mutual battleground, which was himself. He did not much mind his lack of freedom, but he did mind the senseless destruction of so many of his papers.

The original typescript of his autobiography was long lost, but he had wheedled the President—the pretender, that is, who called himself the President—into sending someone

to find what could be found of them. A few tattered and incomplete carbon copies had turned up. He had restored some of the gaps as best his memory and available data permitted, telling again the story of how he had planned Project Alpha-Aleph and meticulously itemizing the details of how he had lied, forged and falsified to bring it about.

He was as honest as he could be. He spared himself nothing. He admitted his complicity in the "accidental" death of Ann Barstow's first husband in a car smash, thus leaving her free to marry the man he had chosen to go with the crew to Alpha Centauri. He had confessed he had known the secret would not last out the duration of the trip, thus betraying the trust of the President who made it possible. He put it all in, all he could remember, and boasted of his success.

For it was clear to him that his success was already proved. What could be surer evidence of it than what had happened ten years ago? The "incident of next week" was as dramatic and complete as anyone could wish. If its details were still indecipherable, largely because of the demolition of the existing technology structure it had brought about, its main features were obvious. The shower of heavy particles—baryon? perhaps even quarks?—had drenched the Earth. The source had been traced to a point in the heavens identical with that plotted for the *Constitution*.

Also there were the messages received; taken together, there was no doubt that the astronauts had developed knowledge so far in advance of anything on Earth that, from two light-years out, they could impose their will on the human race. They had done it. In one downpour of particles, the entire military-industrial complex of the planet was put out of action.

How? How? Ah, thought Knefhausen, with envy and pride, that was the question. One could not know. All that was known was that every nuclear device—bomb, power plant, hospital radiation source or stockpile—had simultaneously soaked up the stream of particles and at that moment ceased to exist as a source of nuclear energy. It was not rapid and catastrophic, like a bomb. It was slow and long-lasting. The uranium and the plutonium simply melted, in the long, continuous reaction that was still bubbling away in the seething lava lakes where the silo had stood and the nuclear power plants had generated electricity. Little radiation was released, but a good deal of heat.

Knefhausen had long since stopped regretting what could not be helped, but wistfully he still wished he had the opportunity to measure the total heat flux properly. Not less than 10^{16} watt-years, he was sure, just to judge by the effects on the Earth's atmosphere, the storms, the gradual raising of temperature all over, above all by the rumors about the

upward trend of sea level that bespoke the melting of the polar ice caps. There was no longer even a good weather net, but the fragmentary information he was able to piece together suggested a world increase of four, maybe as many as six or seven degrees Celsius already, and the reactions still seething away in Czechoslovakia, the Congo, Colorado and a hundred lesser infernos.

Rumors about the sea level?

Not rumors, no, he corrected himself, lifting his head and staring at the snake of hard rubber hose that began under the duckboards at the far end of the room and ended outside the barred window, where the gasoline pump did its best to keep the water level inside his cell below the boards. Judging by the inflow, the grounds of the White House must be nearly awash.

The door opened. The President of the United States (Washington) walked in, patting the shoulder of the thin, scared, hungry-looking kid who was guarding the door.

"How's it going, Knefhausen?" the President began sunnily. "You ready to listen to a little reason yet?"

"I'll do whatever you say, Mr. President, but as I have told you there are certain limits. Also I am not a young man, and my health—"

"Screw your health and your limits," shouted the President. "Don't start up with me, Knefhausen!"

"I am sorry, Mr. President," whispered Knefhausen.

"Don't be sorry! I judge by results. You know what it takes to keep that pump going just so you won't drown? Gas is rationed, Knefhausen! Takes a high national priority to get it! I don't know how long I'll be able to justify this continuous drain on our resources if you don't cooperate."

Sadly, but stubbornly, Knefhausen said: "As far as I am able, Mr. President, I cooperate."

"Yeah. Sure." But the President was in an unusually good mood today, Knefhausen observed, with the prisoner's paranoid attention to detail, and in a moment he said: "Listen, let's not get up tight about this. I'm making you an offer. Say the word and I'll fire that dumb son of a bitch Harry Stokes and make you my Chief Science Adviser. How would that be? Right up at the top again. An apartment of your own. Electric lights! Servants—you can pick 'em out yourself, and there're some nice-looking little girls in the pool. The best food you ever dreamed of. A chance to perform a real service for the U. S. of A., helping to reunify this great country to become once again the great power it should and must be!"

"Mr. President," Knefhausen said, "naturally, I wish to help in any way I can, but we have been over all this before. I'll do anything you like, but I don't know how to make the bombs work again. You saw what happened, Mr. President. They're gone."

"I didn't say bombs, did I? Look, Kneffie, I'm a reasonable man. How about this: You promise to use your best scientific efforts *in any way you can.* You say you can't make bombs; all right. But there will be other things."

"What other things, Mr. President?"

"Don't push me, Knefhausen. Anything at all. Anything where you can perform a service for your country. You give me that promise and you're out of here today. Or would you rather I just turned off the pump?"

Knefhausen shook his head, not in negation but in despair. "You do not know what you are asking. What can a scientist do for you today? Ten years ago, yes—even five years ago. We could have worked something out maybe, I could have done something. But now the preconditions do not exist. When all the nuclear plants went out— When the factories that depended on them ran out of power— When the fertilizer plants couldn't fix nitrogen and the insecticide plants couldn't deliver— When the people began to die of hunger and the pestilences started—"

"I know all that, Knefhausen. Yes, or no?"

The scientist hesitated, looking thoughtfully at his adversary. A gleam of the old shrewdness appeared in his eyes.

"Mr. President," he said slowly. "You know something. Something has happened."

"Right," crowed the President. "You're smart. Now tell me, what is it I know?"

Knefhausen shook his head. After seven decades of vigorous life, and another decade of slowly dying, it was hard to hope again. This terrible little man, this upstart, this lump—he was not without a certain animal cunning, and he seemed very sure. "Please, Mr. President. Tell me."

The President put a finger to his lips, and then an ear to the door. When he was convinced no one could be listening, he came closer to Knefhausen and said softly:

"You know that I have trade representatives all over, Knefhausen. Some in Houston, some in Salt Lake, some even in Montreal. They are not always there just for trade. Sometimes they find things out, and tell me. Would you like to know what my man in Anaheim has just told me?"

Knefhausen did not answer, but his watery old eyes were imploring.

"A message," whispered the President.

"From the *Constitution?*" cried Knefhausen. "But, no, it is not possible! Farside is gone, Goldstone is destroyed, the orbiting satellites are running down—"

"It wasn't a radio message," said the President. "It came from Mount Palomar. Not the big telescope, because that got ripped off, too, but what they call a Schmidt. Whatever that is. It still works. And they still have some old fogies who look

through it now and then, for old times' sake. And they got a message, in laser light. Plain Morse code. From what they said was Alpha Centauri. From your little friends, Knefhausen."

He took a piece of paper from his pocket and held it up.

Knefhausen was racked by a fit of coughing, but he managed to croak: "Give it to me!"

The President held it away. "A deal, Knefhausen?"

"Yes, yes! Anything you say, but give me the message!"

"Why, certainly," smiled the President, and passed over the much-creased sheet of paper. It said:

> PLEASE BE ADVISED. WE HAVE CREATED THE PLANET ALPHA-ALEPH. IT IS BEAUTIFUL AND GRAND. WE WILL SEND OUR FERRIES TO BRING SUITABLE PERSONS AND OTHERS TO STOCK IT AND TO COMPLETE CERTAIN OTHER BUSINESS. OUR SPECIAL REGARDS TO DR. DIETER VON KNEFHAUSEN, WHOM WE WANT TO TALK TO VERY MUCH. EXPECT US WITHIN THREE WEEKS OF THIS MESSAGE.

Knefhausen read it over twice, stared at the President and read it again. "I . . . I am very glad," he said inadequately.

The President snatched it back, folded it and put it in his pocket, as though the message itself was the key to power. "So you see," he said, "It's simple. You help me, I help you."

"Yes. Yes, of course," said Knefhausen, staring past him.

"They're your friends. They'll do what you say. All those things you told me that they can do—"

"Yes, the particles, the ability to reproduce, the ability, God save us, to build a planet—" Knefhausen might have gone on cataloguing the skills of the spacemen indefinitely, but the President was impatient:

"So it's only a matter of days now, and they'll be here. You can imagine what they'll have! Guns, tools, everything—and all you have to do is get them to join me in restoring the United States of America to its proper place. I'll make it worth their while, Knefhausen! And yours, too. They—"

The President stopped, observing the scientist carefully. Then he cried "Knefhausen!" and leaped forward to catch him.

He was too late. The scientist had fallen limply to the duckboards. The guard, when ordered, ran for the White House doctor, who limped as rapidly to the scene as his bad legs and brain soaked with beer would let him, but he was too late, too. Everything was too late for Knefhausen, whose old heart had failed him . . . as it proved a few days later—when the great golden ships from Alpha-Aleph landed and disgorged their bright, terrible crewmen to clean up the Earth—just in time. ■