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The nature of the supernatural

■ The “supernatural” is, as everyone knows of course, that hodgepodge of superstitions, unrealities, and nonsense that stupid, ignorant, or misinformed people mistakenly think are realities.

That neat, simple, and soul-satisfying definition has one minor flaw—it’s a definition by negation. It’s like asking “How is an elephant like a transistor?” and claiming that a proper answer is “Neither one can be used like a microscope.” The negative assertion is perfectly true, of course—but in that negative respect, elephants, transistors, planets, subatomic particles, and in fact everything in the universe, except a microscope, is similar.

The trouble with the usual indefinite definition-by-negation used for “superstition” and “supernatural” is that it includes everything *except* what the speaker himself believes true. For one thing, it doesn’t distinguish between ignorance, fantasy, and improbable-but-real-experiences of the other fellow.

And the greatest difficulty of all is that the term is, if you look at it very closely, close kin to the terms "love," "fear" and "yearning"—a term referring, in strict fact, to an emotional attitude rather than an objective phenomenon—or non-phenomenon.

Imagine an explorer encountering a primitive tribe who have never before seen anyone from a higher culture.

First, he pulls from his pocket a Polaroid camera, snaps a picture of the high chief, turns the camera around, and removes the finished photograph, all in fifteen seconds.

The natives are not impressed. A vulture swoops down over the village, on silent, gliding wings. The villagers are not impressed by that, either. It flies; so what? It's the peculiar, but well-recognized nature of vultures to fly. There's nothing disturbing emotionally about that—even though no native villager can duplicate the feat. Odd, but not supernatural.

And the fact that this stranger from a strange land has the odd characteristic of pulling queerly mottled pieces of paper from a complicated contraption . . . well, their local witch doctor does equally odd things. It must be natural for this stranger—as natural as flying for vultures. Further, inasmuch as most human primitives, who have never before seen

two-dimensional black-and-white representations of a three-dimensional colored world can't recognize the transformation without considerable training—the natives won't see anything very useful in the stranger's odd characteristic.

So, of course, they're not impressed.

But then, while villagers and stranger are standing there in the bright sunlight, an anteater comes wandering down the main pathway of the village.

Abruptly the villagers explode into loud gabble. They run for their huts, children are snatched up, the witch doctor is summoned to action . . .

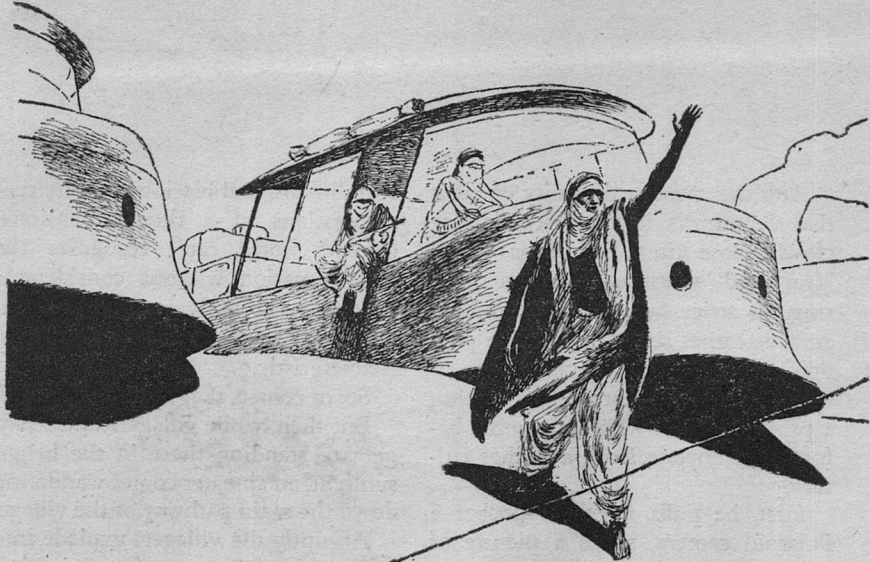
Under his direction, with odd, but rapid ceremonies, using a specially hexed arrow, the anteater is killed.

Meanwhile the explorer stands scratching his head, and wondering what gives. Why were the villagers so afraid of the harmless anteater?

Why—it's obvious to anyone who lives in the territory! The anteater was behaving in a supernatural manner, of course!

It's all right for the vulture to fly—but the explorer would have been just as startled as the natives if one of the village mongrel dogs had taken off and soared after it in hot pursuit. It's all right for vultures to fly . . . but dogs . . . ?! No! That would be supernatural—against Nature. Con-

« *Continued on page 175* »



BLACK MAN'S BURDEN

The turmoil in Africa is only beginning—
and it must grow worse before it's better.
Not until the people of Africa
know they are Africans—not
warring tribesmen—will there be peace...



BY MACK REYNOLDS

Illustrated by Schoenherr



"Take up the white man's burden
Send forth the best ye breed . . ."
—Kipling

I

The two-vehicle caravan emerged from the sandy wastes of the *erg* and approached the small encampment of Taitoq Tuareg which consisted of seven goat leather tents. They were not unanticipated, the camp's scouts had noted the strange pillars of high-flung dust which were set up by the air rotors an hour earlier and for the past fifteen minutes they had been visible to all.

Moussa-ag-Amastan, headman of the clan, awaited the newcomers at first with a certain trepidation in spite of his warrior blood. Although he hadn't expressed himself thus to his followers, his first opinion had been that the unprecedented pillars were djinn come out of the *erg* for no good purpose. It wasn't until they were quite close that it could be seen the vehicles bore resemblance to those of the Rouma which were of recent years spreading endlessly through the lands of the Ahaggar Tuareg and beggaring those who formerly had conducted the commerce of the Sahara.

But vehicles traveling through the sand dunes! That had been the last advantage of the camel. No wheeled vehicle could cross the vast stretches of the *ergs*, they must stick to the hard ground, to be tire-destroying gravel.

They came to a halt and Moussa-ag-

Amastan drew up his teguelmoust turban-veil even closer about his eyes. He had no desire to let the newcomers witness his shocked surprise at the fact that the desert lorries had no wheels, floated instead without support, and now that they were at a standstill settled gently to earth.

There was further surprise when the five who issued forth from the two seemingly clumsy vehicles failed to be Rouma. They looked more like the Teda to the south, and the Targui's eyes thinned beneath his teguelmoust. Since the French had pulled out their once dreaded Camel Corps there had been somewhat of a renaissance of violence between traditional foes.

However, the newcomers, though dark as Negro Bela slaves, wore Tuareg dress, loose baggy trousers of dark indigo-blue cotton cloth, a loose, nightgownlike white cotton shirt, and over this a *gandoura* outer garment. Above all, they wore the teguelmoust though they were shockingly lax in keeping it properly up about the mouth.

Moussa-ag-Amastan knew that he was backed by ten or more of his clansmen, half of whom bore rifles, the rest Tuareg broadswords, Crusader-like with their two edges, round points and flat rectangular crossmembers. Only two of the strangers seemed armed and they negligently bore their smallish guns in the crocks of their arms. The clan leader spoke at strength, then, but he said the traditional, "*La bas.*"

"There is no evil," repeated the

foremost of the newcomers. His Tamahéq, the Berber language of the Tuareg confederations, seemed perfect.

Moussa-ag-Amastan said, "What do you do in the lands of the Taitoq Tuareg?"

The stranger, a tall, handsome man with a dominating though pleasant personality, indicated the vehicles with a sweep of his hand. "We are Enaden, itinerent smiths. As has ever been our wont, we travel from encampment to encampment to sell our products and to make repair upon your metal possessions."

Enaden! The traveling smiths of the Abaggar, and indeed of the whole Sahara, were a despised and ragged lot at best. Few there were that ever possessed more than a small number of camels, a sprinkling of goats, perhaps a sheep or two. But these seemed as rich as Roumas, as Europeans or Americans.

Moussa-ag-Amastan muttered, "You jest with us at your peril, stranger." He pointed an aged but still strong hand at the vehicles. "Enaden do not own such as these."

The newcomer shrugged. "I am Omar ben Crawford and these are my followers, Abraham el Bakr Ma el Ainin, Keni Ballalou and Bey-ag-Akhamouk. We come today from Tamanrasset and we are smiths, as we can prove. As is known, there is high pay to be earned by working in the oil fields, at the dams on the Niger, in the afforestation projects, in the sinking of the new wells whose pumps utilize the rays of the sun, in the de-

veloping of the great new oases. There is much Rouma money to be made in such work and my men and I have bought these vehicles specially built in the new factories in Dakar for desert use."

"Slave work!" one of Moussa-ag-Amastan's kinsmen sneered.

Omar ben Crawford shrugged in obvious amusement, but there was a warmth and vitality in the man that quickly affected even strangers. "Perhaps," he said. "But times change, as every man knows, and today there no longer need be hunger, nor illness, nor any want—if a man will but work a fraction of each day."

"Work is for slaves," Moussa-ag-Amastan barked.

The newcomer refused to argue. "But all slaves have been freed, and where in the past this meant nothing since the Bela had no place to go, no way to live save with his owner, today it is different and any man can go and find work on the many projects that grow everywhere. So the slaves slip away from the Tuareg, and the Teda and Chaamba. Soon there will be no more slaves to do the work about your encampments. And then what, man of the desert?"

"We'll fight!" Moussa-ag-Amastan growled. "We Tuareg are warriors, bedouin, free men. We will never be slaves."

"*Inshallah*. If God wills it," the smith agreed politely.

"Show us your wares," the old chieftain snapped. "We chatter like women. Talk can wait until the evening meal and in the men's quarters

of my tent." He approached the now parked vehicles and his followers crowded after him. From the tents debouched women and children. The children were completely nude, and the Tuareg women were unveiled for such are the customs of the Ahaggar Tuareg that the men go veiled but women do not.

One of the lorries was so constructed that a side could be raised in such fashion as to display a wide variety of tools, weapons, household utensils, and textiles. Ohs and ahs punctuated the air, women being the same in every land. Two of the smiths brought forth metal-working equipment of strange design and set up shop to one side. A broken bolt on an aged Lebel rifle was quickly repaired, a copper cooking pot brazed, some harness tinkered with.

Of a sudden, Moussa-ag-Amastan said, "But your women, your families, where are they?"

The one who had been introduced as Abraham el Bakr, an open-faced man whose constant smiling seemed to take a full ten years off what must have been his age, explained. "On the big projects, one can find employment only if he allows his children to attend the new schools. So our wives and children remain near Tamanrasset while the children learn the lore of books."

"Rouma schools!" one of the warriors sneered.

"Oh, no. There are few Roumas remaining in all the land now," the

smith said easily. "Those that are left serve us in positions our people as yet cannot hold, in construction of the dams, in the bringing of trees to the desert, but soon, even they will be unneeded."

"*Our* people?" Moussa-ag-Amastan rumbled ungraciously. "You are smiths. The smiths have no people. You are neither Kel Rela, Tégehé Mellet, Taitoq, nor even Teda, Chamba, or Ouled Tidrarin."

One of the smiths said easily, "In the great construction camps, in the new towns, with their many ways to work and become rich, the tribes are breaking up. Tuareg works next to Teda and a Moor next to a former Haratin serf." He added, as though unthinkingly, even as he displayed an aluminum pan to a wide-eyed Tuareg matron, "Indeed, even the clans break up and often Tuareg marries Arab or Sudanese or Rifs down from the north . . . or even we Enaden."

The clansmen were suddenly silent, in shocked surprise.

"That cannot be true!" the elderly chief snapped.

Omar ben Crawford looked at him mildly. "Why should my follower lie?"

"I do not know, but we will talk of it later, away from the women and children who should not hear such abominations." The chief switched subjects. "But you have no flocks with you. How are we to pay for these things, these services?"

"With money."

The old man's face, what little could be seen through his teguel-

moust, darkened. "We have little money in the Ahaggar."

The one named Omar nodded. "But we are short of meat and will buy several goats and perhaps a lamb, a chicken, eggs. Then, too, as you have noted, we have left our women at home. We will need the services of cooks, some one to bring water. We will hire servants."

The other said gruffly "There are some Bela who will serve you."

The smith seemed taken aback. "Verily, El Hassan has stated that the product of the labor of the slave is accursed."

"El Hassan! Who is El Hassan and why should the work of a slave be accursed?"

One of the tribesmen said, "I have heard of this El Hassan. Rumors of his teachings spread through the land. He is to lead us all, Tuareg, Arab and Sudanese, until we are all as rich as Roumas."

Omar said, "It is well known that the Roumas and especially the Americans, are all rich as Emirs but none of them ever possess slaves. The bedouin have slaves but fail to prosper. Verily, the product of the labor of the slave is accursed."

"Madness," Moussa-ag-Amastan muttered. "If you do not let our slave women do your tasks, then they will remain undone. No Tuareg woman will work."

But the headman of his clan was wrong.

The smiths remained four days in

all, and the abundance of their products was too much. What verbal battles might have taken place in the tent of Moussa-ag-Amastan, and in those of his followers, the smiths couldn't know, but Tuareg women are not dominated by their men. On the second day, three Tuareg women applied for the position of servants, at surprisingly high pay. Envy ran roughshod when they later displayed the textiles and utensils they purchased with their wages.

Nor could the aged Tuareg chief prevent in the evening discussions between the men, a thorough pursuing of the new ideas sweeping through the Ahaggar. Though these strangers proclaimed themselves lowly Enaden—itinerant desert smiths—they were obviously not to be dismissed as a caste little higher than Haratin serfs. Even the first night they were invited to the tent of Moussa-ag-Amastan to share the dinner of shorba soup, cous cous and the edible paste *kaboosh*, made of cheese, butter and spices. It was an adequate desert meal, meat being eaten not more than a few times a year by such as the Taitoq Tuareg who couldn't afford to consume the animals upon which they lived.

After mint tea, one of the younger Tarqui leaned forward. He said, "You have brought strange news, oh Enaden of wealth, and we would know more. We of the Ahaggar hear little from outside."

Moussa-ag-Amastan scowled at his clansman, for his presumption, but Omar answered, his voice sincere and

carrying conviction. "The world moves fast, men of the desert, and the things that were verily true even yesterday, have changed today."

"To the sorrow of the Tuareg!" snapped Moussa-ag-Amastan.

The other looked at him. "Not always, old one. Surely in your youth you remember when such diseases as the one the Roumas once called the disease of Venus, ran rampant through the tribes. When trachoma, the sickness of the eyes, was known as the scourge of the Sahara. When half the children, not only of Bela slaves and Haratin serfs, but also of the Surgu noble clans, died before the age of ten."

"Admittedly, the magic of the Roumas cured many such ills," an older warrior growled.

"Not their magic, their learning," the smith named El Ma el Ainin put in. "And, verily, now the schools are open to all the people."

"Schools are not for such as the Bela and Haratin," the clan chief protested. "The Koran should not be taught to slaves."

El Ma el Ainin said gently, "The Koran is not taught at all in the new schools, old one. The teachings of the Prophet are still made known to those interested, in the schools connected with the mosques, but only the teachings of science are made in the new schools."

"The teachings of the Rouma!" a Tuareg protested, carefully slipping his glass of tea beneath his teguelmoust so that he could drink without his mouth being obscenely revealed.

Omar ben Crawford laughed. "That is what we have allowed the Roumas to have us believe for much too long," he stated. "El Hassan has proven otherwise. Much of the wisdom of science has its roots in the lands of Asia and of Africa. The Roumas were savages in skins while the earliest civilizations were being developed in Africa and Asia Minor. Hardly a science now developed by the Roumas of Europe and America but had its beginning with us." He turned to the elderly chief.

"You Tuareg are of Berber background. But a few centuries ago, the Berbers of Morocco, known as the Moors to the Rouma, leavened only with a handful of Jews and Arabs, built up in Spain the highest civilization in all the world of that time. We would be foolish, we of Africa, to give credit to the Rouma for so much of what our ancestors presented to the world."

The Tuareg were astonished. They had never heard such words.

Moussa-ag-Amastan was not appeased. "You sound like a Rouma, yourself," he said. "Where have you learned of all this?"

The smiths chuckled their amusement.

Abraham el Bakr said, "Verily, old one, have you ever seen a black Rouma?"

Omar ben Crawford, the headman of the smiths, went on. "El Hassan has proclaimed great new beliefs that spread through all North Africa, and eventually, *Inshallah*, throughout the continent. Through his great learning

he has assimilated the wisdom of all the prophets, all the wisemen of all the world, and proclaims their truths."

The Tuareg chief was becoming increasingly irritated. Such talk as this was little short of blasphemy to his ears, but the fascination of the discussion was beyond him to ignore. And he knew that even if he did his young men, in particular, would only seek out the strangers on their own and then he would not be present to mitigate their interest. In spite of himself, now he growled, "What beliefs? What truths? I know not of this El Hassan of whom you speak."

Omar said slowly, "Among them, the teachings of a great wise man from a far land. That all men should be considered equal in the eyes of society and should have equal right to life, liberty and the pursuit of happiness."

"Equal!" one of the warriors ejaculated. "This is not wisdom, but nonsense. No two men are equal."

Omar waggled a finger negatively. "Like so many, you fail to explore the teaching. Obviously, no man of wisdom would contend that all men are equally tall, or strong, or wise, or cunning, nor even fortunate. No two men are equal in such regards. But all men should have equal right to life, liberty and the pursuit of happiness, whatever that might mean to him as an individual."

One of the Tuareg said slyly, "And the murderer of one of your kinsmen, should he, too, have life and liberty, in the belief of El Hassan?"

"Obviously, the community must

protect itself against those who would destroy the life or liberty of others. The murderer of a kinsman of mine, as well as any other man, myself included, should be subject equally to the same law."

It was a new conception to members of a tribal society such as that of the Ahaggar Tuareg. They stirred under both its appeal and its negation of all they knew. A man owed alliance to his immediate family, to his clan, his tribe, then to the Tuareg confederation—in decreasing degree. Beyond that, all were enemies, as all men knew.

One protested slowly, seeking out his words, "Your El Hassan preaches this equality, but surely the wiser man and the stronger man will soon find his way to the top in any land, in any tribe, even in the nations of the Rouma."

Omar shrugged. "Who could contend otherwise? But each man should be free to develop his own possibilities, be they strength of arm or of brain. Let no man exploit another, nor suppress another's abilities. If a Bela slave has more ability than a Surgu Tuareg noble, let him profit to the full by his gifts."

There was a cold silence.

Omar finished gently by saying, "Or so El Hassan teaches, and so they teach in the new schools in Tamanrasset and Gao, in Timbuktu and Reggan, in the big universities at Kano, Dakar, Bamako, Accra and Abidjan. And throughout North Africa the wave of the future flows over the land."

"It is a flood of evil," Moussa-ag-Amastan said definitely.

But in spite of the antagonism of the clan headman and of the older Tuareg warriors, the stories of the smiths continued to spread. It was not even beyond them to discuss, long and quietly, with the Bela slaves the ideas of the mysterious El Hassan, and to talk of the plentiful jobs, the high wages, at the dams, the new oases, and in the afforestation projects.

Somehow the news of their presence spread, and another clan of nomad Tuareg arrived and pitched their tents, to handle the wares of the smiths and to bring their metal work for repair. And to listen to their disturbing words.

As amazing as any of the new products was the solar powered, portable television set which charged its batteries during the daylight hours and then flashed on its screen the images and the voices and music of entertainers and lecturers, teachers and storytellers, for all to see. In the beginning it had been difficult, for the eye of the desert man is not trained to pick up a picture. He has never seen one, and would not recognize his own photograph. But in time, it came to them.

The programs originated in Tamanrasset and In Salah, in Zinder and Fort Lamy and one of the smiths revealed that the mysterious waves, that fed the device its programs, were bounced off tiny moons which the

Rouma had rocketed up into the sky for that purpose. A magic understandable only to marabouts and such, without doubt.

At the end of their period of stay, the smiths, to the universal surprise of all, gave the mystery device to two sisters, kinswomen of Moussa-ag-Amastan, who were particularly interested in the teachers and lecturers who told of the new world aborning. The gift was made in the full understanding that all should be allowed to listen and watch, and it was clear that if ever the set needed repair it was to be left tinkered with and taken to Tamanrasset or the nearest larger settlement where it would be fixed free of charge.

There were many strange features about the smiths, as each man could see. Among others, were their strange weapons. There had been some soft whispered discussion among the warriors in the first two days of their stay about relieving the strangers of their obviously desirable possessions—after all, they weren't kinsmen, nor even Tuareg. But on the second day, the always smiling one named Abraham el Bakr had been on the outskirts of the *erg* when a small group of gazelle were flushed. The graceful animals took off at a prohibitive rifle range, as usual, but Abraham el Bakr had thrown his small, all but tiny, weapon to his shoulder and *flic flic flic*, with a sound no greater than the cracking of a ground nut, had knocked over three of them before the others had disappeared around a dune.

Obviously, the weapons of the

smiths were as great as their learning and their new instruments. It was discouraging to a raider by instinct.

Then, too, there was the strangeness of the night talks their leader was known to have with his secret *Kambu* fetish which was able to answer him in a squeaky but distinct voice in some unknown tongue, obviously a language of the djinn. The *Kambu* was worn on a strap on Omar's wrist, and each night at a given hour he was wont to withdraw to his tent and there confer.

On the fourth night, obviously, he was given instruction by the *Kambu* for in the morning, at first light, the smiths hurriedly packed, broke camp, made their good-byes to Moussa-ag-Amastan and the others and were off.

Moussa-ag-Amastan was glad to see them go. They were quite the most disturbing element to upset his people in many seasons. He wondered at the advisability of making

their usual summer journey to the Tuareg sedentary centers. He had a feeling that if the clan got near enough to such centers as Zinder to the south, or Touggourt to the north, there would be wholesale desertion of the Bela, and, for that matter, even of some of his younger warriors and their wives.

However, there was no putting off indefinitely exposure to this danger. Even in such former desert centers as Tessalit and In Salah, the irrigation projects were of such magnitude that there was a great labor shortage. But always, of course, as the smiths had said, if you worked at the projects your children must needs attend the schools. And that way lay disaster!

The five smiths took out overland in the direction of Djanet on the border of what had once been known as Libya and famed for its cliffs which tower over twenty-five hundred feet above the town. Their solar powered,



air cushion, hover-lorries, threw up their clouds of dust and sand to right and left, but they made good time over the *erg*. A good hovercraft driver could do much to even out a rolling landscape, changing his altitude from a few inches here to as much as twenty-five feet there, given, of course, enough power in his solar batteries, although that was little problem in this area where clouds were sometimes not seen for years on end.

This was back of the beyond, the wasteland of earth. Only the interior of the Arabian peninsula and the Gobi could compete and, of course, even the Gobi was beginning to be tamed under the afforestation efforts of the teeming multitudes of China who had suffered its disastrous storms down through the millennia.

Omar checked and checked again with the instrument on his wrist, asking and answering, his voice worried.

Finally they pulled up beside a larger than usual wadi and Omar ben Crawford stared thoughtfully out over it. The one they had named Abraham el Bakr stood beside him and the others slightly to the rear.

Abraham el Bakr nodded, for once his face unsmiling, "Those cats'll come down here," he said. "Nothing else would make sense, not even to an Egyptian."

"I think you're right," Omar growled. He said over his shoulder, "Bey, get the trucks out of sight, over that dune. Elmer, you and Kenny set

the gun up over there. Solid slugs, and try to avoid their cargo. We don't want to set off a Fourth of July here. Bey, when you're finished with the trucks, take that Tommy-Noiseless of yours and flank them from over behind those rocks. Take a couple of clips extra, for good luck—you won't need them, though."

"How many are there supposed to be?" Abraham el Bakr asked, his voice empty of humor now.

"Eight half-trucks, two armed jeeps, or land-rovers, one or the other. Probably about forty men, Abe."

"All armed," Abe said flatly.

"Um-m-m. Listen, that's them coming. Right down the *wadi*. Get going men. Abe, you cover me."

Abe Bakr looked at him. "Wha'd'ya mean, cover you, man? You slipped all the way round the bend? Listen, let me plant a couple quick land mines to stop 'em and we'll get ourselves behind these rocks and blast those cats half way back to Cairo."

"We'll warn them as per orders."

"Crazy man, like you're the boss, Homer," Abe growled. "But why'd I ever leave New Jersey?" He made his way to the right, to the top of the wadi's bank and behind a clump of thorny bush. He made himself comfortable, the light Tommy-Noiseless with its clip of two hundred .10 caliber, ultra-high velocity shells resting before him on a flat rock outcropping. He thoughtfully flicked the selector to the explosive side of the clip. Let Homer Crawford say what he would about not setting off a Fourth of July, but if he needed covering in

the moments to come, he'd need it bad.

The chips were down now.

The convoy, the motors growling their protests of the hard going even here at the gravel bottomed wadi river bed, made its way toward them at a pace of approximately twenty kilometers per hour.

The lead jeep—Skoda manufacture, Homer Crawford noted cynically—was some thirty meters in advance. It drew to a halt upon seeing him and a turbaned Arab Union trooper swung a Brenn gun in his direction.

An officer stood up in the jeep and yelled at Crawford in Arabic.

The American took a deep breath and said in the same language, "You're out of your own territory."

The officer's face went poker-expressionless. He looked at the lone figure, dressed in the garb of the Tuareg, even to the turban-veil which covers all but the eyes of these notorious Apaches of the Sahara.

"This is no affair of yours," the lieutenant said. "Who are you?"

Homer Crawford said very clearly, "Sahara Division, African Development Project, Reunited Nations. You're far out of your own territory, lieutenant. I'll have to report you, and also to demand that you turn and go back to your origin."

The lieutenant flicked his hand, and the trooper behind the Brenn gun sighted the weapon and tightened his trigger finger.

Crawford dropped to the ground and rolled desperately for a slight

depression that would provide cover. He could have saved himself the resultant bruises and scratches. Before the Brenn gun spoke even once, there was a *Götterdämmerung* of sound and the three occupants of the jeep, driver, lieutenant and gunner were swept from the vehicle in a nauseating obscenity of exploding flesh, uniform cloth, blood and bone.

To the side, Abe Bakr behind his thorn bush and rock vantage point turned the barrel of his Tommy-Noiseless to the first of the half tracks. Already Arab Union troopers were debouching from them, some firing at random and at unseen targets. However, the so-called Enaden smiths were well concealed, their weapons silenced except for the explosion of the tiny shells upon reaching their target.

It wasn't much of a fight. The recoilless automatic rifle manned by Elmer Allen and Kenny Ballalou swept the wadi, swept it of life, at least, but hardly swept it clean. What few individuals were left, in what little shelter was to be found in the dry river's bottom, were picked off easily, if not neatly by the high velocity automatics in the hands of Abe Bakr and Bey-ag-Akhamouk.

Afterwards, the five of them, standing at the side of the wadi, stared down at their work.

Elmer Allen muttered a bitter four-letter obscenity. He had once headed a pacifist group at the University in Kingston, Jamaica. Now his teeth were bared, as they always were when he went into action. He hated it.

Of them all, Bey-ag-Akhamouk was the least moved by the slaughter. He grumbled, "Guns, explosives, mortar, flame throwers. If there is anything in the world my people don't need in the way of *aid*, it's weapons."

"Our people," Homer Crawford said absently, his eyes—taking in the scene beneath them—empty, as though unseeing. He hated the need for killing, almost as badly as did Elmer Allen.

Bey looked at him, scowling slightly, but said nothing. There had been mild rebuke in his leader's voice.

"Well," Abe Bakr said with a tone of mock finality in his voice, as though he was personally wiping his hands of the whole affair, "how are you going to explain all this jazz to headquarters, man?"

Homer said flatly, "We were attacked by this unidentified group of, ah, gun runners, from some unknown origin. We defended ourselves, to the best of our ability."

Elmer Allen looked at the once human mess below them. "We certainly did," he muttered, scowling.

"Crazy man," Abe said, nodding his agreement to the alibi.

The others didn't bother to speak. Homer Crawford's unit was well knit.

He said after a moment, "Abe, you and Kenny get some dynamite and plant it in this wadi wall in a few spots. We'll want to bury this whole mess. It wouldn't do for someone to come along and blow himself up on some of these scattered land

mines, or find himself a bazooka or something to use on his nearest blood-feud neighbor."

II

The young woman known as Izubahil was washing clothes in the Niger with the rest but slightly on the outskirts of the chattering group of women, which was fitting since she was both a comparative stranger and as yet unselected by any man to grace his household. Which, in a way, was passingly strange since she was comely enough. Clad as the rest with naught but a wrap of colored cloth about her hips, her face and figure were openly to be seen. Her complexion was not quite so dark as most. She came from up-river, so she said, the area of the Songhoï, but by the looks of her there was more than average Arab or Berber blood in her veins. Her lips and nose were thinner than those of her neighbors.

Yes, it was strange that no man had taken her, though it was said that in her shyness she repulsed any advances made by either the young men, or their wealthier elders who could afford more than one wife. She was a nothing-woman, really, come out of the desert alone, and without relatives to protect her interests, but still she repulsed the advances of those who would honor her with a place in their house, or tent.

She had come out of the desert, it was known, with her handful of possessions done up in a packet, and

had quietly and unobtrusively taken her place in the Negro community of Gao. Little better than a slave or Gabibi serf, she made her meager living doing small tasks for the better-off members of the community.

But she knew her place, was dutifully shy and quiet spoken, and in the town or in the presence of men, wore her haik and veil. Yes, it was passing strange that she had found no man. On the face of it, she was getting no younger, surely she must be into her twenties.

Up to their knees in the waters of the Niger, out beyond the point where the dugout canoes were pulled up to the bank, their ends resting on the shore, they pounded their laundry. Laughing, chattering, gossiping. Life was perhaps poor, but still life was good.

Someone pretended to see a crocodile and there was a wild scampering for the shore. And then high laughter when the jest was revealed. Actually, all the time they had known it a jest, since it was their most popular one—there were seldom crocodiles this far north in the Niger bend.

There was a stir as two men dressed in the clothes of the Rouma approached the river bank. It was not forbidden, but good manners called for males to refrain from this area while the women bathed and washed their laundry, without veil or upper garments. These men were obviously shameless, and probably had come to stare. From their dress, their faces and their bearing, they were strangers. Possibly Senegalese, up from the

area near Dakar, products of the new schools and the new industries mushrooming there. Strange things were told of the folk who gave up the old ways, worked on the dams and the other new projects, sent their little ones to the schools, and submitted to the needle pricks which seemed to compose so much of the magic medicine being taught in the medical schools by the Rouma witchmen.

One of them spoke now in Songhoi, the *lingua franca* of the vicinity. Shamelessly he spoke to them, although none were his women, nor even his tribal kin. None looked at him.

"We seek a single woman, an unwed woman, who would work for pay and learn the new ways."

They continued their laundry, not looking up, but their chatter dribbled away.

"She must drop the veil," the man continued clearly, "and give up the haik and wear the new clothes. But she will be well paid, and taught to read and be kept in the best of comfort and health."

There was a low gasp from several of the younger women, but one of the eldest looked up in distaste. "Wear the clothes of the Rouma!" she said indignantly. "Shameless ones!"

The man's voice was testy. He himself was dressed in the clothing worn always by the Rouma, when the Rouma had controlled the Niger bend. He said, "These are not the clothes of the Rouma, but the clothes of civilized people everywhere."

The women's attention went back to their washing. Two or three of them giggled.

The elderly woman said, "There are none here who will go with you, for whatever shameless purpose you have in your mind."

But Izubahil, the strange girl come out of the desert from the north, spoke suddenly. "I will," she said.

There was a gasp, and all looked at her in wide-eyed alarm. She began making her way to the shore, her unfinished washing still in hand.

The stranger said clearly, "And drop the veil, discard the haik for the new clothing, and attend the schools?"

There was another gasp as Izubahil said definitely, "Yes, all these things." She looked back at the women. "So that I may learn all these new ways."

The more elderly sniffed and turned their backs in scorn, but the younger stared after her in some amazement and until she disappeared with the two strangers into one of the buildings which had formerly housed the French Administration officers back in the days when the area was known as the French Sudan.

Inside, the boy strangers turned to her and the one who had spoken at the river bank said in English, "How goes it?"

"Heavens to Betsy," Isobel Cunningham said with a grin, "get me a drink. If I'd known majoring in anthropology was going to wind up with my doing a strip tease with a bunch of natives in the Niger River,

I would have taken up Home Economics, like my dear old mother wanted!"

They laughed with her and Jacob Armstrong, the older of the two, went over to a sideboard and mixed her a cognac and soda. "Ice?" he said.

"Brother, you said it," she told him. "Where can I change out of these rags?"

"On you they look good," Clifford Jackson told her. He looked surprisingly like the Joe Louis of several decades earlier.

"That's enough out of you, wise guy," Isobel told him. "Why doesn't somebody dream up a role for me where I can be a rich paramount chief's favorite wife, or something? Be loaded down with gold and jewelry, that sort of thing."

Jake brought her the drink. "Your clothes are in there," he told her, motioning with his head to an inner room. "It wouldn't do the job," he added. "What we're giving them is the old Cinderella story." He looked at his watch. "If we get under way, we can take the jet to Kabara and go into your act there. It's been nearly six months since Kabara and they'll be all set for the second act."

She knocked back the brandy and made her way to the other room, saying over her shoulder, "Be with you in a minute."

"Not that much of a hurry," Cliff called. "Take your time, gal, there's a bath in there. You'll probably want one after a week of living the way you've been."

"Brother!" she agreed.

Jake was making himself a drink. He said easily to Cliff Jackson, "That's a fine girl. I'd hate her job. We get the easy deal on this assignment."

Cliff said, "You said it, Nigger. How about mixing me a drink, too?"

"Nigger!" Jake said in mock indignation. "Look who's talking." His voice took on a burlesque of a Southern drawl. "Man when the Good Lawd was handin' out *cullabs*, you musta thought he said *umbrellabs*, and said give me a nice black one."

Cliff laughed with him and said, "Where do we plant poor Isobel next?"

Jake thought about it. "I don't know. The kid's been putting in a lot of time. I think after about a week in Kabara we ought to go on down to Dakar and suggest she be given another assignment for a while. Some of the girls, working out of our AFAA office don't do anything except drive around in recent model cars, showing off the advantages of emancipation, tossing money around like tourists, and living it up in general."

On the flight up-river to Kabara, Isobel Cunningham went through the notes she'd taken on that town. It was also on the Niger, and the assignment had been almost identical to the Gao one. In fact, she'd gone through the same routine in Ségou, Ké-Macina, Mopti, Gôundam and Bourem, above Gao, and Ansongo, Tillabéri and Niamey below. She was stretching her luck, if you asked her. Sooner or later she was going to run

into someone who knew her from a past performance.

Well, let the future take care of the future. She looked over at Cliff Jackson who was piloting the jet and said, "What're the latest developments? Obviously, I haven't seen a paper or heard a broadcast for over a week."

Cliff shrugged his huge shoulders. "Not much. More trouble with the Portuguese down in the south."

Jake rumbled, "There's going to be a bloodbath there before it's over."

Isobel said thoughtfully, "There's been some hope that fundamental changes might take place in Lisbon."

Jake grunted his skepticism. "In that case the bloodbath would take place there instead of in Africa." He added, "Which is all right with me."

"What else?" Isobel said.

"Continued complications in the Congo."

"That's hardly news."

"But things are going like clockwork in the west. Kenya, Uganda, Tanganyika." Cliff took his right hand away from the controls long enough to make a circle with its thumb and index finger. "Like clockwork. Fifty new fellows from the University of Chicago came in last week to help with the rural education development and twenty or so men from Johns Hopkins in Baltimore have wrangled a special grant for a new medical school."

"All . . . Negroes?"

"What else?"

Jake said suddenly, "Tell her about the Cubans."

Isobel frowned. "Cubans?"

"Over in the Anglo-Egyptian Sudan area. They were supposedly helping introduce modern sugar refining methods—"

"Why supposedly?"

"Why not?"

"All right, go on," Isobel said.

Cliff Jackson said slowly, "Somebody shot them up. Killed several, wounded most of the others."

The girl's eyes went round. "Who . . . and why?"

The pilot shifted his heavy shoulders again.

Jake said, "Nobody seems to know, but the weapons were modern. Plenty modern." He twisted in his bucket seat, uncomfortably. "Listen, have you heard anything about some character named El Hassan?"

Isobel turned to face him. "Why, yes. The people there in Gao mentioned him. Who is he?"

"That's what I'd like to know," Jake said. "What did they say?"

"Oh, mostly supposed words of wisdom that El Hassan was alleged to have made with. I get it that he's some, well you wouldn't call him a nationalist since he's international in his appeal, but he's evidently preaching union of all Africans. I get an undercurrent of anti-Europeanism in general, but not overdone." Isobel's expressive face went thoughtful. "As a matter of fact, his program seems to coincide largely with our own, so much so that from time to time when I had occasion to drop a few words of propoganda into a conversation, I'd sometimes credit it to him."

Cliff looked over at her and chuckled. "That's a coincidence," he said. "I've been doing the same thing. An idea often carries more weight with these people if it's attributed to somebody with a reputation."

Jake, the older of the three said: "Well, I can't find out anything about him. Nobody seems to know if he's an Egyptian, a Nigerian, a MOR . . . or an Eskimo, for that matter."

"Did you check with headquarters?"

"So far they have nothing on him, except for some other inquiries from field workers."

Below them, the river was widening out to the point where it resembled swampland more than a waterway. There were large numbers of waterbirds, and occasional herds of hippopotami. Isobel didn't express her thoughts, but a moment of doubt hit her. What would all this be like when the dams were finished, the waters of this third largest of Africa's rivers, ninth largest of the world's, under control?

She pointed. "There's Kabara." The age-old river port lay below them. Cliff slapped one of his controls with the heel of his hand and the craft began to sink earthward.

They took up quarters in the new hotel which adjoined the new elementary school, and Isobel immediately went into her routine.

Dressed and shod immaculately, her head held high in confidence, she spent considerable time mingling

with the more backward of the natives and especially the women. Six months ago, she had given a performance similar to that she had just finished in Gao, several hundred miles down river.

Now she renewed old acquaintances, calling them by name—after checking her notes. Invariably, their eyes bugged. Their questions came thick, came fast in the slurring Songhoi and she answered them in detail. They came quickly under her intellectual domination. Her poise, her obvious well being, flabbergasted them.

In all, they spent a week in the little river town, but even the first night Isobel slumped wearily in the most comfortable chair of their small suite's living room.

She kicked off her shoes, and wiggled weary toes.

"If my mother could see me now," she complained. "After giving her all to get the apple of her eye through school, her wayward daughter winds up living with two men in the wilds of deepest Africa." She twisted her mouth puckishly.

Cliff grunted, poking around in a bag for the bottle of cognac he couldn't remember where he had packed. "Huh!" he said. "The next time you write her you might mention the fact that both of them are continually proposing to you and you brush it all off as a big joke."

"Huh, indeed!" Isobel answered him. "Proposing, or propositioning? If either of you two Romeos ever rattle the doorknob of my room at night

again, you're apt to get a bullet through it."

Jake winced. "Wasn't me. Look at my gray hair, Isobel. I'm old enough to be your daddy."

"Sugar daddy, I suppose," she said mockingly.

"Wasn't me either," Cliff said, crisscrossing his heart and pointing upward.

"Huh!" said Isobel again, but she was really in no mood for their usual banter. "Listen," she said, "what're we accomplishing with all this masquerade?"

Cliff had found the French brandy. He poured three stiff ones and handed drinks to Isobel and Jake.

He knew he wasn't telling her anything, but he said, "We're a king-size rumor campaign, that's what we are. We're breaking down institutions the sneaky way." He added reflectively. "A kinder way, though, than some."

"But this . . . what did you call it earlier, Jake? . . . this Cinderella act I go through perpetually. What good does it do, really? I contact only a few hundreds of people at most. And there are millions here in Mali alone."

"There are other teams, too," Jake said mildly. "Several hundreds of us doing one thing or another."

"A drop in the bucket," Isobel said, her piquant sepian face registering weariness.

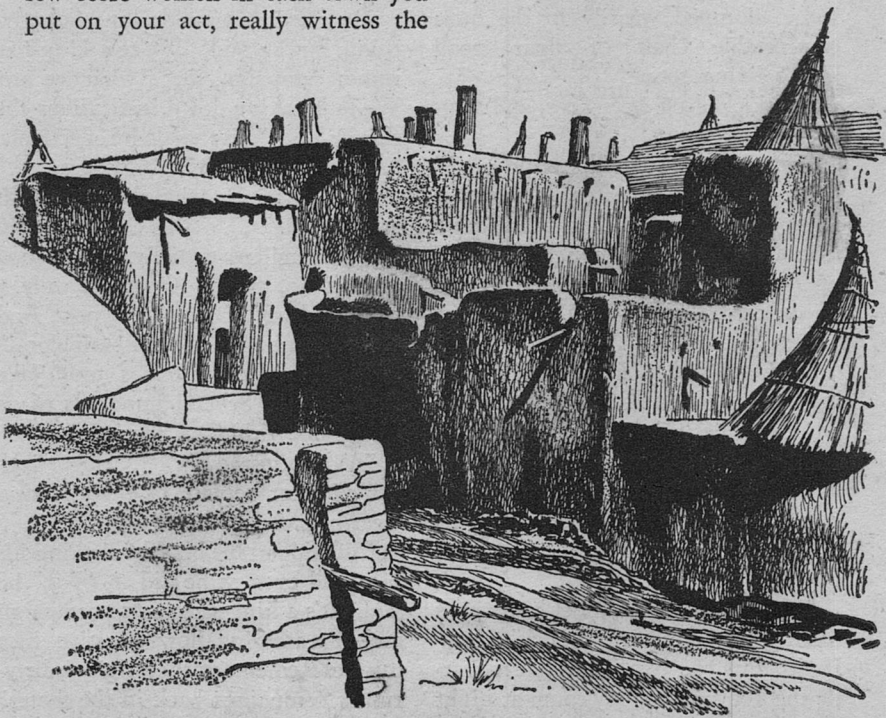
Cliff sipped his brandy, shaking his big head even as he did so. "No," he said. "It's a king-size rumor campaign and it's amazing how effective they can be. Remember the original dirty-rumor campaigns back in the States?"

Suppose two large laundry firms were competing. One of them, with a manager on the conscience-less side, would hire two or three professional rumor spreaders. They'd go around dropping into bars, barber shops, pool rooms. Sooner or later, they'd get a chance to drop some line such as *did you hear about them discovering that two lepers worked at the Royal Laundry?* You can imagine the barbers, the bartenders, and such professional gossips, passing on the good word."

Isobel laughed, but unhappily. "I don't recognize myself in the description."

Cliff said earnestly, "Sure, only few score women in each town you put on your act, really witness the

whole thing. But think how they pass it on. Each one of them tells the story of the miracle. A waif comes out of the desert. Without property, without a husband or family, without kinsfolk. Shy, dirty, unwanted. Then she's offered a good position if she'll drop the veil, discard the haik, and attend the new schools. So off she goes—everyone thinking to her disaster. Hocus-pocus, six months later she returns, obviously prosperous, obviously healthy, obviously well adjusted. Fine. The story spreads for miles around. Nothing is so popular as the Cinderella story, and that's the story you're putting over. It's a natural."





"I hope so," Isobel said. "Sometimes I think I'm helping put over a gigantic hoax on these people. Promising some-

thing that won't be delivered."

Jake looked at her unhappily. "I've thought the same thing, sometimes, but what are you going to be with people at this stage of development—*subtle?*"

Isobel dropped it. She held out her glass for more cognac. "I hope there's something decent to eat in this place. Do you realize what I've been putting into my tummy this past week?"

Cliff shuddered.

Isobel patted her abdomen. "At least it keeps my figure in trim."

"Um-m-m," Jake pretended to leer heavily.

Isobel chuckled at him in a return to good humor. "Hyena," she accused.

"Hyena?" Jake said.

"Sure, there aren't any wolves in these parts," she explained. "How long are we going to be here?"

The two men looked at each other. Cliff said, "Well, we'd like to finish out the week. Guy named Homer Crawford has been passing around the word to hold a meeting in Timbuktu the end of this week."

"Crawford?"

"Homer Crawford, some kind of sociologist from the University of Michigan, I understand. He's connected with the Reunited Nations African Development Project, heads one of their cloak and dagger teams."

Jake grunted. "Sociologist? I also understand that he put in a hitch with the Marines and spent kind of a shady period of two years fighting with the FLN in Algeria."

"On what side?" Cliff said interestedly.

"Darn if I know."

Isobel said, "Well, we have nothing to do with the Reunited Nations."

Cliff shook his large head negatively. "Of course not, but Crawford seems to think it'd be a good idea if some of us in the field would get together and . . . well, have sort of a bull session."

Jake growled, "We don't have much in the way of co-operation on the higher levels. Everybody seems to head out in all directions on their own. It can get chaotic. Maybe in the field we could give each other a few pointers. For one, I'd like to find out if any of the rest of these jokers know anything about that affair with the Cubans over in the Sudan."

"I suppose it can't hurt," Isobel admitted. "In fact, it might be fun swapping experiences with some of these characters. Frankly, though, the stories I've heard about the African Development teams aren't any too palatable. They seem to be a ruthless bunch."

Jake looked down into his glass. "It's a ruthless country," he murmured.

Dolo Anah, as he approached the ten Dogon villages of the Canton de

Sangha, was first thought to be a small bird in the sky. As he drew nearer, it was decided, instead, that he was a larger creature of the air, perhaps a vulture, though who had ever seen such a vulture? As he drew nearer still, it was plain that in size he was more nearly an ostrich than vulture, but who had ever heard a flying ostrich, and besides—

No! It was a man! But who in all the Dogon had ever witnessed such a *juju* man? One whose flailing limbs enabled him to fly!

The ten villages of the Dogon are perched on the rim of the Falaise de Bandiagara. The cliffs are over three hundred feet high and the villages are similar to Mesa Verde of Colorado, and as unaccessible, as impregnable to attack.

But hardly impregnable to arrival by helio-hopper.

When Dolo Anah landed in the tiny square of the village of Irèli, the first instinct of Amadijué the village witchman was to send post haste to summon the Kanaga dancers, but then despair overwhelmed him. Against powers such as this, what could prevail? Besides, Amadijué had not arrived at his position of influence and affluence through other than his own true abilities. Secretly, he rather doubted the efficacy of even the supposedly most potent witchcraft.

But this!

Dolo Anah unstrapped himself from the one man helio-hopper's small bicyclelike seat, folded the two rotors back over the rest of the craft, and then deposited the seventy-five

pound vehicle in a corner, between two adobe houses. He knew perfectly well that the local inhabitants would die a thousand deaths of torture rather than approach, not to speak of touching it.

Looking to neither right nor left, walking arrogantly and carrying only a small bag—undoubtedly housing his *gris gris*, as Amadijué could well imagine—Dolo Anah headed for the largest house. Since the whole village was packed, bug-eyed, into the square watching him there were no inhabitants within.

He snapped back over his shoulder, "Summon all the headmen of all the villages, and all of their eldest sons; summon all the Hogons and all the witchmen. Immediately! I would speak with them and issue orders."

He was a small man, clad only in a loincloth, and could well have been a Dogon himself. Surely he was black as a Dogon, clad as a Dogon, and he spoke the native language which is a tongue little known outside the semi-desert land of Dogon covered with its sand, rocks, scrub bush and baobab trees. It is not a land which sees many strangers.

The headmen gathered with trepidation. All had seen the *juju* man descend from the skies. It had been with considerable relief that most had noted that he finally sank to earth in the village of Irèli instead of their own. But now all were summoned. Those among them who were Kanaga dancers wore their masks and costumes, and above all their *gris gris* charms, but it was a feeble gesture.

Such magic as this was unknown. To fly through the air *personally!*

Dolo Anah was seated to one end of the largest room of the largest house of Irèli when they crowded in to answer his blunt summons. He was seated cross-legged on the floor and staring at the ground before him.

The others seemed tongue-tied, both headmen and Hogons, the highly honored elders of the Dogon people. So Amadijuè as senior witchman took over the responsibility of addressing this mystery juju come out of the skies.

"Oh, powerful stranger, how is your health?"

"Good," Dolo Anah said.

"How is the health of thy wife?"

"Good."

"How is the health of thy children?"

"Good."

"How is the health of thy mother?"

"Good."

"How is the health of thy father?"

"Good."

"How is the health of thy kinswomen?"

"Good."

"How is the health of thy kinsmen?"

"Good."

To the traditional greeting of the Dogon, Amadijuè added hopefully, "Welcome to the villages of Sangha."

His voice registering nothing beyond the impatience which had marked it from the beginning, Dolo Anah repeated the routine.

"Men of Sangha," he snapped, "how is your health?"

"Good," they chorused.

"How is the health of thy wives?"

"Good!"

"How is the health of thy children?"

"Good!"

"How is the health of thy mothers?"

"Good!"

"How is the health of thy fathers?"

"Good!"

"How is the health of thy kinswomen?"

"Good!"

"How is the health of thy kinsmen?"

"Good!"

"I accept thy welcome," Dolo Anah bit out. "And now heed me well for I am known as Dolo Anah and I have instructions from above for the people of the Dogon."

Sweat glistened on the faces and bodies of the assembled Dogon headmen, their uncharacteristically silent witchmen, the Hogons and the sons of the headmen.

"Speak, oh juju come out of the sky," Amadijuè fluttered, but proud of his ability to find speech at all when all the others were stricken dumb with fear.

Dolo Anah stared down at the ground before him. The others, their eyes fascinated as though by a cobra preparing to strike its death, focused on the spot as well.

Dolo Anah raised a hand very slowly and very gently and a sigh went through his audience. The dirt on the

hut floor had stirred. It stirred again and slowly, ever so slowly, up through the floor emerged a milky, translucent ball. When it had fully emerged, Dolo Anah took it up in his hands and stared at it for a long moment.

It came to sudden light and a startled gasp flushed over the room, a gasp shared by even the witchmen, Amadijuè included.

Dolo Anah looked up at them. "Each of you must come in turn and look into the ball," he said.

Faltering, though all eyes were turned to him, Amadijuè led the way. His eyes rounded, he stared, and they widened still further. For within, mystery upon mystery, men danced in seeming celebration. It was as though it was a funeral party but of dimensions never known before, for there were scores of Kanaga dancers, and, yes, above all other wonders, some of the dancers were Dogon, without doubt, but others were Mosse and others were even Tellum!

Amadijuè turned away, shaken, and Dolo Anah spoke sharply, "The rest, one by one."

They came. The headmen, the Hogons, the witchmen and finally the sons of the headmen, and each in turn stared into the ball and saw the tiny men within, doing their dance of celebration, Dogon, Mosse and Tellum together.

When all had seen, Dolo Anah placed the ball back on the ground and stared at it and slowly it returned to from whence it came, and Dolo Anah gently spread dust over the spot. When the floor was as it

had been, he looked up at them, his eyes striking.

"What did you see?" he spoke sharply to Amadijuè.

There was a tremor in the village witchman's voice. "Oh juju, come out of the sky, I saw a great festival and Dogon danced with their enemies the Mosse and the Tellum—and, all seemed happy beyond belief."

The stranger looked piercingly at the rest. "And what did you see?"

Some mumbled, "The same. The same," and others, terrified still, could only nod.

"That is the message I have come to give you. You will hold a great conference with the people of the Tellum and the people of the Mosse and there will be a great celebration and no longer will there be Dogon, Mosse and Tellum, but all will be one. And there will be trade, and there will be marriage between the tribes, and no longer will there be three tribes, but only one people and no longer will the headmen and witchmen of the tribes resist the coming of the new schools, and all the young people will attend."

Amadijuè stuttered, "But, great juju come out of the sky, these are our blood enemies. For longer than the memory of the grandfathers of our eldest Hogon we have carried the blood feud with Tellum and Mosse."

"No longer," Dolo Anah said flatly.

Amadijuè held shaking hands out in supplication, to this dominating juju come out of the skies. "But they will not heed us. Tellum and Mosse have hated the Dogon for all time.

They will wreak their vengeance on any delegation come to make such suggestions to them."

"I fly to see their headmen and witchmen immediately," Dolo Anah bit out decisively. "They will heed my message." His tone turned dangerous. "As will the headmen and witchmen of the Dogon. If any fail to obey the message from above, their eyes will lose sight, their tongues become dumb, and their bellies will crawl with worms."

Amadijuè's face went ashen.

At long last the headman of all the Sangha villages spoke up, his voice trembling its fear. "But the schools, oh great juju—as all the Dogon have decided, in tribal conference—the schools are evil for our youth. They teach not the old ways—"

Dolo Anah cut him short with the chop of a commanding hand. "The old ways are fated to die. Already they die. The new ways are the ways of the schools."

Amazed at his own temerity, the head chief spoke once more. "But, since the coming of the French, we have rejected the schools."

Dolo Anah looked at him in scorn. "These will not be schools of the French. They will be schools of Bantu, Berber, Sudanese and all the other peoples of the land. And when your young people have attended the schools and learned their wisdom they in turn will teach in the schools and in all the land there will be wisdom and good life. Now have spoken and all of you will withdraw save only the sons of the headmen."

They withdrew, making a point each and every one not to turn their backs to this bringer of disastrous news and leaving only the terror-stricken young men behind them.

When all were gone save the dozen youngsters, Dolo Anah looked at them contemplatively. He shrugged finally and said, pointing with his finger, "You, you and you may leave. The others will remain." The three darted out, glad of the reprieve.

He looked at the remainder. "Be unafraid," he snapped. "There is no reason to fear me. Your fathers and the Hogons and the so-called witchmen, are fools, nothing-men. Fools and cowards, because they are impressed by foolish tricks."

He pointed suddenly. "You, there, what is your name?"

The youth stuttered, "Hinnan."

"Very well, Hinnan. Did you see me approach by the air?"

"Yes . . . yes . . . juju man."

"Don't call me a juju man. There is no such thing as juju. It is nonsense made by the cunning to fool the stupid, as you will learn when you attend the schools."

Hinnan took courage. "But I saw you fly."

"Have you never seen the great aircraft of the white men of Europe and America go flying over? Or have none of you witnessed these craft sitting on the ground at Mopti or Niamey. Surely some of you have journeyed to Mopti."

"Yes, but they are great craft. And you flew alone and without the great wings and propellers of the white-man's aircraft."

Dolo Anah chuckled. "My son, I flew in a helio-hopper as they are called. They are the smallest of all aircraft, but they are not magic. They are made in the factories of the lands of Europe and America and after you have finished school and have found a position for yourself in the new industries that spread through Africa, then you will be able to purchase one quite cheaply, if you so desire. Others among you might even learn to build them, themselves."

Hinnan and the others gasped.

Dolo Anah went on, "And observe this." He dug into the ground before him and revealed the crystal ball that had magically appeared before. He showed to them the little elevator device beneath it which he manipulated with a small rubber bulb which pumped air underneath.

One or two of them ventured a scornful laugh, at the obviousness of the trick.

Dolo Anah took up the ball and unscrewed the base. Inside were a delicate arrangement of film on a continuous spool so that the scene played over and over again, and a combination of batteries and bulbs to project the scene on the ball's surface. He explained, in patient detail, the workings of the supposed magic ball. Two of the boys had seen movies on trips to Mopti, the others had heard of them.

Finally one, highly encouraged

now, as were the others, said, "But why do you show us this and shame us for our foolishness?"

Dolo Anah nodded encouragement at the teen-ager. "I do not shame *you*, my son, but your fathers and the Hogons and the so-called witchmen. For long ages the Dogon have been led by the oldest members of the tribe, the Hogons. This can be nonsense because in spite of your traditions age does not necessarily bring wisdom. In fact, senility as it is called can bring childish nonsense. A people should be governed by the wisest and best among them, not by tradition, by often silly beliefs handed down from one generation to another."

Hinnan, who was eldest son of the head chief, said, "But why do you tell us this, after shaming our fathers and the old men of the Dogon?"

For the first time since the elders had left, Dolo Anah's eyes gleamed as before. "Because you will be the leaders of the Dogon tomorrow, most like. And it is necessary to learn these great truths. That you attend the schools and bring to the Dogon tomorrow what they did not have yesterday, and do not have today."

"But suppose we tell them of how you have deceived them?" the other articulate Dogon lad said.

Dolo Anah chuckled and shook his head. "They will not believe you, boy. They will be afraid to believe you. And besides, men are almost everywhere the same. It is difficult for an older man to learn from a younger one, especially his own son. It is van-

ity, but it is true." His mouth twisted in memory. "When I was a lad myself, on the beaches of an island far from here in the Bahamas, my father beat me on more than one occasion, indignant that I should wish to attend the white man's schools, while he and his father before him had been fishermen. Beneath his indignation was the fear that one day I would excel him."

"You are right," Hinnan said uncomfortably, "they would not believe us." Instinctively, the son of the head chief assumed leadership of the others. "We will keep this secret between us," he said to them.

Dolo Anah came to his feet, yawned, stretched his legs and began to pack his gadgets into the small valise he carried. "Good luck, boys," he said unthinkingly in English.

As he left the hut, he emerged into a respectfully cleared area around the hut. Without looking left or right he approached his folded helio-hopper, made the few adjustments that were needed to make it air-borne, strapped himself into the tiny saddle, flicked the start control and to the accompaniment of a gasp from the entire village of Irèli, took off in a swoop.

In a matter of moments, he had disappeared to the north in the direction of the Mosse villages.

III

The Emir Alhaji Mohamadu, the Galadima Dawakin, Kudo of Kano, boiled furiously within as his gold

plated Rolls Royce progressed through the Saba N'Gari section of town, the quarter outside the dirt walls of the millennium old city. He rode seated alone in the middle of the rear seat and his single counselor sat beside the chauffeur. Before them, a jeep load of his bodyguard, dressed in their uniforms of red and green, cleared the way. Another jeep followed similarly laden.

They entered through one of the ancient gates and swept up the principal street. They stopped before the recently constructed luxury hotel in the center of town and the bodyguard leapt from the jeeps and took positions to each side of the entry. The counselor popped out from his side of the car and beat the chauffeur to the task of opening the Emir's door.

Emir Alhaji Mohamadu was a tall man and a heavy one, his white robed figure towered some six and a half feet and his scales put him over the three hundred mark. He was in his mid fifties and almost a quarter century of autocratic position had marked his face with permanent scowl. He stomped now into the western style hotel.

His counselor, Ahmadu Abdullah, had already procured the information necessary to locate the source of the Emir's ire and now scurried before his chief, leading the way to the suite occupied by the mysterious strangers. He banged heavily on the door, then stepped behind his master as it opened.

One of the strangers, clad western style, opened the door and stepped

aside courteously motioning to the large inner room. The Emir strutted arrogantly inside and stared in high irritation at the second and elder stranger who sat there at a heavy table. This one came to his feet, but there was no sign of acknowledgment of the Emir's rank. It was not too long a time before that men prostrated themselves in Alhaji Mohammadu's presence.

He looked at them. Though both were of dark complexion, there seemed no manner of typing them. Certainly they were neither Hausa nor Fulani, there being no signs of Hamitic features, but neither were they Ibo or Yoruba from farther south. The Emir's eyes narrowed and he wondered if these two were Nigerians at all!

He barked at them in Hausa and the older answered him in the same language, though there seemed a certain awkwardness in its use.

Emir Alhaji Mohammadu blared, "You dare summon me, Kudo of this city? You presume—"

They had resumed seats behind the table and the two of them looked at him questioningly. The older one interrupted with a gently raised hand. "Why did you come?"

Still glaring, the Emir turned to the cringing Ahmadu Abdullah and motioned curtly for the counselor to speak. Meanwhile, the ruler's eyes went around the room, decided that the couch was the only seat that would accommodate his bulk, and descended upon it.

Ahadu Abdullah brought a paper

from the folds of his robes. "This lying letter. This shameless attack upon the Galadima Dawakin!"

The younger stranger said mildly, "If the charges contained there are incorrect, then why did you come?"

The Emir rumbled dangerously, ignoring the question. "What is your purpose? I am not a patient man. There has never been need for my patience."

The spokesman of the two, the older, leaned back in his chair and said carefully, "We have come to demand your resignation and self-exile."

A vein beat suddenly and wildly at the gigantic Emir's temple and for a full minute the potentate was speechless with outrage.

Ahadu Abdullah said quickly, "Fantastic! Ridiculous! The Galadima Dawakin is lawful ruler and religious potentate of three million devoted followers. You are lying strangers come to cause dissention among the people of Kano and—"

The spokesman for the newcomers took up a sheaf of papers from the table and said, his voice emotionless, "The reason you came here at our request is because the charges made in that letter you bear are valid ones. For a quarter century, you, Alhaji Mohammadu, have milked your people to your own profit. You have lived like a god on the wealth you have extracted from them. You have gone far, far beyond the legal and even traditional demands you have on the local population. Funds supposedly to be devoted to education,

sanitation, roads, hospitals and a multitude of other developments that would improve this whole benighted area, have gone into your private pocket. In short, you have been a cancer on your people for the better part of your life."

"All lies!" roared the Kudo.

The other shook his head. "No. We have carefully gathered proof. We can submit evidence to back every charge we have made. Above all, we can prove the existence of large sums of money you have smuggled out of the country to Switzerland, London and New York to create a reserve for yourself in case of emergency. Needless to say, these funds, too, were originally meant for the betterment of the area."

The Emir's eyes were narrow with hate. "Who are you? Whom do you represent?"

"What difference does it make? This is of no importance."

"You represent my son, Alhaji Fodio! This is what comes of his studies in England and America. This is what comes of his leaving Kano and spending long years in Lagos among those unbeliever communists in the south!"

The younger stranger chuckled easily. "That is about the last tag I would hang on your son's associates," he said in English.

But the older stranger was nodding. "It is true that we hope your son will take over the Emirate. He represents progress. Frankly, his plans are to end the office as soon as the people are educated to the point

where they can accept such change."

"End the office!" the Emir snarled. "For a thousand years my ancestors —"

The spokesman of the strangers shook his head wearily. "Your ancestors conquered this area less than two centuries ago in a jihad led by Othman Dan. Since then, you Fulani have feudalistically dominated the Hausa, but that is coming to an end."

The Emir had come to his feet again, in his rage, and now he towered over the table behind which the two sat as though about to physically attack them. "You speak as fools," he raged.

"Are you so stupid as to believe that these matters you have brought up are understandable to my people? Have you ever seen my people?" He sneered in a caricature of humor. "My people in their grass and bush huts? With not one man in a whole village who can add sums higher than those he can work out on his fingers? With not one man who can read the English tongue, nor any other? Would you explain to these the matters of transferring gold to the Zürich banks? Would you explain to these what is involved in accepting *dash* from road contractors and from politicians in Lagos?"

He sneered at them again. "And do you realize that I am church as well as state? That I represent their God to my people? Do you think they would take your word against *mine*, their Kudo?"

In talking, he had brought a certain calm back to himself. Now he felt reassured at his own words. He wound it up. "You are fools to believe my people could understand such matters."

"Then actually, you don't deny them?"

"Why should I bother?" the Emir chuckled heavily.

"That you have taken for personal use the large sums granted this area from a score of sources for roads, hospitals, schools, sanitation, agricultural modernization?"

"Of course I don't deny it. This is *my* land, I am the Kudo, the Emir, the Galadima Dawakin. Whatever I choose to do in Kano and to all my people is right because I wish it. Schools? I don't want them corrupting my people. Hospitals for these Hausa serfs? Nonsense! Roads? They are bad for they allow the people to get about too easily and that leads to their exchanging ideas and schemes and leads to their corruption. Have I appropriated all such sums for my own use? Yes! I admit it. Yes! But you cannot prove it to such as my people, you who represent my son. So be-gone from Kano. If you are here to-morrow, you will be arrested by the same men of my bodyguard who even now seek my son, Alhaji Fodio. When he is captured, it will be of interest to revive some of the methods of execution of my ancestors."

The Emir turned on his heel to stalk from the room but the older of the two murmured, "One moment, please."

Alhaji Mohammadu paused, his face dark in scowl again.

The spokesman said agreeably, "It is true that your people, and particularly your Hausa serfs, have no understanding of international finance nor of national corruption methods such as the taking of *dash*. However, they are susceptible to other proof." The other man raised his voice. "John!"

From an inner room came another stranger, making their total number three. He was grinning and in one hand held a contraption which boasted a cogglomeration of lenses, switches, microphones, wires and triggers. "Got it perfectly," he said. You'd think it had all been rehearsed."

While the Emir and his counselor stared amazement, the spokesman of the strangers said, "How long before you can project?"

"Almost immediately."

The other young man left the room and returned with what was obviously a movie projector. He set it up at one end of the table, pointing at a white wall, and plugged it in to a convenient outlet.

Before the Emir had managed to control himself beyond the point of saying any more than, "What is all this?" the cameraman had brought a magazine of film from his instrument and inserted it in the projector.

The photographer said conversationally, to the hulking potentate, "You'd be amazed at the advances in cinema these past few years. Film

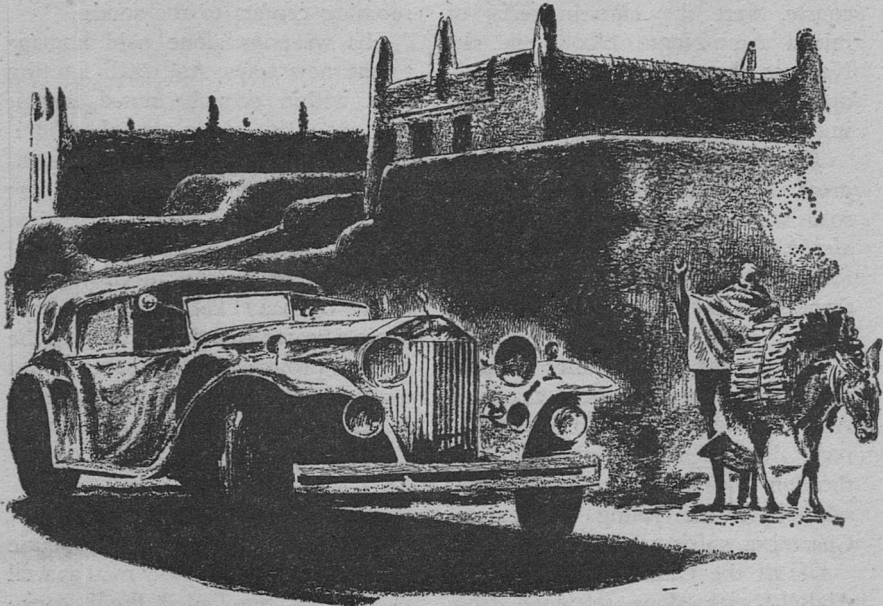
speed, immediate development, portable sound equipment. You'd be amazed."

Someone flicked out the greater part of the room's light. The projector buzzed and on the wall was thrown a re-enactment of everything that had been said and done in the room for the past ten minutes.

When it was over, the lights went on again.

The spokesman said conversationally, "I assume that if this film were shown throughout the villages, even your Hausa serfs would be convinced that throughout your reign you have systematically robbed them."

The gymkhana, or fantasia as it is called in nearby Morocco, was under full swing before Abd-el-Kader and the camel- and horse-mounted warriors of his Ouled Touameur clan came dashing in, rifles held high and with great firing into the air. The Ouled Touameur were the noblest clan of the Ouled Allouch tribe of the Berazga division of the Chaambra nomad confederation—the noblest and the least disciplined. There were whispered rumors going about the conference as to the identity of the mysterious raiders who were preying upon the new oases, the oil and road building camps and the endless other



Emir Alhaji Mohammadu, the Galadima Dawakin, Kudo of Kano, his face in shock, turned and stumbled from the room.

new projects springing up, all but magically, throughout the northwestern Sahara.

The gymkhana was in full swing

with racing and feasting, and storytellers and conjurers, jugglers and marabouts. And in the air was the acrid distinctive odor of *kif*, for though Mohammed forbade alcohol to the faithful he had naught to say about the uses of *cannabis sativa* and what is a great festival without the smoking of *kif* and the eating of *majoun*?

The tribes of the Chaambra were widely represented, Berazga and Mouadhi, Bou Rouba and Ouled Fredj, and there was even a heavy sprinkling of the sedentary Zenatas come down from the towns of Metlili, El Oued, and El Goléo. Then, of course, were the Haratin serfs, of mixed Arab-Negro blood, and the Negroes themselves, until recently openly called slaves, but now—amusingly—named servants.

The Chaambra were meeting for a great ceremonial gymkhanas, but also, as was widely known, for a *djemaa el kebar* council of elders and chiefs, for there were many problems throughout the Western Erg and the areas of Mzab and Bourara. Nor was it secret only to the inner councils that the meeting had been called by Abd-el-Kader, of Shorfu blood, direct descendent of the Prophet through his daughter Fatima, and symbol to the young warriors of Chaambra spirit.

Of all the Ouled Touameur clan Abd-el-Kader alone refrained from discharging his gun into the air as they dashed into the inner circle of *khaima* tents which centered the gymkhana and provided council chambers,

dining hall and sleeping quarters for the tribal and clan heads. Instead, and with head arrogantly high, he slipped from his stallion tossing the reins to a nearby Zenata and strode briskly to the largest of the tents and disappeared inside.

Bismillah! but Abd-el-Kader was a figure of a man! From his turban, white as the snows of the Atlas, to his yellow leather boots, he wore the traditional clothing of the Chaambra and wore them with pride. Not for Abd-el-Kader the new clothing from the Rouma cities to the north, nor even the new manufactures from Dakar, Accra, Lagos and the other mushrooming centers to the south.

His weapons alone paid homage to the new ways. And each fighting man within eyesight noted that it was not a rifle slung over the shoulder of Abd-el-Kader but a sub-machine gun. *Bismillah!* This could not have been so back in the days when the French Camel Corps ruled the land with its hand of iron.

The *djemaa el kebar* was already in session, seated in a great circle on the rug and provided with glasses of mint tea and some with water pipes. They looked up at the entrance of the warrior clan chieftain.

El Aicha, who was of Maraboutic ancestry and hence a holy man as well as elder of the Ouled Fredj, spoke first as senior member of the conference. "We have heard reports that are disturbing of recent months, Abd-el-Kader. Reports of activities

amongst the Ouled Touameur. We would know more of the truth of these. But also we have high interest in your reason for summoning the djemaa el kebar at such a time of year."

Abd-el-Kader made a brief gesture of obeisance to the Chaambra leader, a gesture so brief as to verge on disrespect. He said, his voice clear and confident, as befits a warrior chief, "Disturbing only to the old and unvaliant, O El Aicha."

The old man looked at him for a long, unblinking moment. As a youth, he had fought at the Battle of Tit when the French Camel Corps had broken forever the military power of the Ahaggar Tuareg. El Aicha was no coward. There were murmurings about the circle of elders.

But when El Aicha spoke again, his voice was level. "Then speak to us, Abd-el-Kader. It is well known that your voice is heard ever more by the young men, particularly by the bolder of the young men."

The fighting man remained standing, his legs slightly spread. The Arab, like the Amerind, likes to make speech in conference, and eloquence is well held by the Chaambra.

"Long years ago, and only shortly after the death of the Prophet, the Chaambra resided, so tell the scribes, in the hills of far away Syria. But when the word of Islam was heard and the true believers began to race their strength throughout all the world, the Chaambra came here to the deserts of Africa and here we have remained. Long centuries it took

us to gain control of the wide areas of the northern and western desert and many were the battles we fought with our traditional enemies the Tuareg and the Moors before we controlled all the land between the Atlas and the Niger and from what is now known as Tunisia to Mauritania."

All nodded. This was tribal history.

Abd-el-Kader held up four fingers on which to enumerate. "The Chaambra were ever men. Warriors, bedouin; not for us the cities and villages of the Zenatas, and the miserable Haratin serfs. We Chaambra have ever been men of the tent, warriors, conquerors!"

El Aicha still nodded. "That was before," he murmured.

"That will always be!" Abd-el-Kader insisted. His four fingers were spread and he touched the first one. "Our life was based upon, one, war and the spoils of war." He touched the second finger. "Two, the toll we extracted from the caravans that passed from Timbuktu to the north and back again. Three, from our own caravans which covered the desert trails from Tripoli to Dakar and from Marrakech to Kano. And fourth"—he touched his last finger—"from our flocks which fed us in the wilderness." He paused to let this sink in.

"All this is verily true," muttered one of the elders, a *so-what* quality in his voice.

Abd-el-Kader's tone soured. "Then came the French with their weapons and their multitudes of soldiers and their great wealth with which to pur-

sue the expenses of war. And one by one the Tuareg and the Teda to the south and the Moors and Nemadi, yes, and even the Chaambra fell before the onslaughts of the Camel Corps and their wild-dog Foreign Legion." He held up his four fingers again and counted them off. "The four legs upon which our life was based were broken. War and its spoils was prevented us. The tolls we charged caravans to cross our land were forbidden. And then, shortly after, came the motor trucks which crossed the desert in a week, where formerly the journey took as much as a year. Our camel caravans became meaningless."

Again all nodded. "Verily, the world changes," someone murmured.

The warrior leader's voice went dramatic. "We were left with naught but our flocks, and now even they are fated to end."

The elderly nomads stirred and some scowled.

"At every water hole in the desert teams of the new irrigation development dig their wells, install their pumps which bring power from the sun, plant trees, bring in Haratin and former slaves—*our* slaves—to cultivate the new oases. And we are forbidden the water for the use of our goats and sheep and camels."

"Besides," one of the clan chiefs injected, "they tell us that the goat is the curse of North Africa, nibbling as it does the bark of small trees, and they attempt to purchase all goats until soon there will be few, if any, in all the land."

"So our young people," Abd-el-Kader pressed on, "stripped of our former way of life, go to the new projects, enroll in the schools, take work in the new oases or on the roads, and disappear from the sight of their kinsmen." He came to a sudden halt and all but glared at them, maintaining his silence until El Aicha stirred.

"And—?" El Aicha said. This was all obviously but preliminary.

Abd-el-Kader spoke softly now, and there was a different drama in his voice. "And now," he said, "the French are gone. All the Rouma, save a handful, are gone. In the south the English are gone from the lands of the blacks, such as Nigeria and Ghana, Sierra Leone and Gambia. The Italians are gone from Libya and Somaliland and the Spanish from Rio de Oro. Nor will they ever return for in the greatest council of all the Rouma they have decided to leave Africa to the African."

They all stirred again and some muttered and Abd-el-Kader pushed his point. "The Chaambra are warriors born. Never serfs! Never slaves! Never have we worked for any man. Our ancestors carved great empires by the sword." His voice lowered again. "And now, once more, it is possible to carve such an empire."

He swept his eyes about their circle. "Chiefs of the Chaambra, there is no force in all the Sahara to restrain us. Let others work on the roads, planting the new trees in the new oases, damming the great Niger, and all the rest of it. We will sweep over them, and dominate all. We, the

Chaambra, will rule, while those whom Allah intended to drudge, do so. We, the Chosen of Allah, will fulfill our destiny!"

Abd-el-Kader left it there and crossed his arms on his chest, staring at them challengingly.

Finally El Aicha directed his eyes across the circle of listeners at two who had sat silently through it all, their burnooses covering their heads and well down over their eyes. He said, "And what do you say to all this?"

"Time to go into your act, man," Abe Bakr muttered, under his breath.

Homer Crawford came to his feet and pushed back the hood of the burnoose. He looked over at the headman of the Ouled Touameur warrior clan, whose face was darkening.

In Arabic, Crawford said, "I have sought you for some time, Abd-el-Kader. You are an illusive man."

"Who are you, Negro?" the fighting man snapped.

Crawford grinned at the other. "You look as though you have a bit of Negro blood in your own veins. In fact, I doubt if there's a so-called Arab in all North Africa, unless he's just recently arrived, whose family hasn't down through the centuries mixed its blood with the local people they conquered."

"You lie!"

Abe chuckled from the background. The Chaambra leader was at least as dark of complexion as the American

Negro. Not that it made any difference one way or the other.

"We shall see who is the liar here," Homer Crawford said flatly. "You asked who I am. I am known as Omar ben Crawford and I am headman of a team of the African Development Project of the Reunited Nations. As you have said, Abd-el-Kader, this great council of the headmen of all the nations of the world—not just the Rouma—has decided that Africa must be left to the Africans. But that does not mean it has lost all interest in these lands. It has no intention, warrior of the Chaambra, to allow such as you to disrupt the necessary progress Africa must make if it is not to become a danger to the shaky peace of the world."

Abd-el-Kader's eyes darted about the tent. So far as he could see, the other was backed only by his single henchman. The warrior chief gained confidence. "Power is for those who can assert it. Some will rule. It has always been so. Here in the Western Erg, the Chaambra will rule, and I, Abd-el-Kader will lead them!"

Homer Crawford was shaking his head, almost sadly it seemed. "No," he said. "The day of rule by the gun is over. It must be over because at long last man's weapons have become so great that he must not trust himself with them. In the new world which is still aborning so that half the nations of earth are in the pains of labor, government must be by the most wise and most capable."

In a deft move the sub-machine gun's sling slipped from the desert

man's shoulder and the short, vicious gun was in hand. "The strong will always rule!" the Arab shouted. "Time was when the French conquered the Chaambra, but the French have allowed their strength to ebb away, and now, armed with such weapons as these, we of the Sahara will again assert our birthright as the Chosen of Allah!"

Abe Baker chuckled. "That cat sure can lay on a speech, man." As though magically, a snub-nosed hand weapon of unique design had appeared in his dark hand.

El Aicha's voice was suddenly strong and harsh. "There shall be no violence at a djemaa el kebar."

Homer ignored the automatic weapon in the hands of the excited Arab. He said, and there was still a sad quality in his voice. "The gun you carry is a nothing-weapon, desert man. When the French conquered this land more than a century ago they were armed with single-shot rifles which were still far in advance of your own long barrelled flintlocks. Today, you are proud of that tommy gun you carry, and, indeed, it has the fire power of a company of the Foreign Legion of a century past. However, believe me, Abd-el-Kader, it is a nothing-weapon compared to those that will be brought against the Chaambra if they heed your words."

The desert leader put back his head and laughed his scorn.

He chopped his laughter short and snapped, more to the council of chiefs than to the stranger. "Then we will seize such weapons and use them

against those who would oppose us. In the end it is the strong who win in war, and the Rouma have gone soft, as all men know. I, Abd-el-Kader will have these two killed and then I shall announce to the assembled tribes the new jedah, a Holy War to bring the Chosen of Allah once again to their rightful position in the Sahara."

"Man," Abe Baker murmured pleasantly, "you're going to be one awful disappointed cat before long."

El Aicha said mildly, "Such decisions are for the djemaa el kebar to make, O Abd-el-Kader, not for a single chief of the Ouled Touameur."

The desert warrior chief sneered openly at the old man. "Decisions are made by those with the strength to enforce them. The young men of the Chaambra support me, and my men surround this tent."

"So do mine," Homer Crawford said decisively. "And I have come to arrest you and take you to Colomb-Béchar where you will be tried for your participation in recent raids on various development projects."

El Aicha repeated his earlier words. "There shall be no violence at a djemaa el kebar."

The Ouled Touameur chief's eyes had narrowed. "You are not strong enough to take me."

In English, Abe Baker said, "Like maybe these young followers of this cat need an example laid on them, man."

"I'm afraid you're right," Crawford growled disgustedly.

The younger American came to his feet. "I'll take him on," Abe said.

"No, he's nearer to my size," Crawford grunted. He turned to El Aicha, and said in Arabic, "I demand the right of a stranger in your camp to a trial by combat."

"On what grounds?" the old man scowled.

"That my manhood has been spat upon by this warrior who does his fighting with his loud mouth."

The assembled chiefs looked to Abd-el-Kader, and a rustling sigh went through them. A hundred times the wiry desert chieftain had proven himself the most capable fighter in the tribes. A hundred times he had proven it and there were dead and wounded in the path he had cut for himself.

Abd-el-Kader laughed aloud again. "Swords, in the open before the ascan.

Homer Crawford shrugged. "Swords, in the open before the assembled Chaambra so that they may see how truly weak is the one who calls himself so strong."

Abe said worriedly, in English, "Listen, man, you been checked out on swords?"

"They're the traditional weapon in the Arab *code duello*," Homer said, with a wry grin. "Nothing else would do."

"Man, you sound like you've been blasting pot and got yourself as high as those cats out there with their *kif*. This Abd-el-Kader was probably raised with a sword in his hand."

Abd-el-Kader smiling triumphant-

ly, had spun on his heel and made his way through the tent's entrance. Now they could hear him shouting orders.

El Aicha looked up at Homer Crawford from where he sat. His voice without inflection, he said, "Hast thou a sword, Omar ben Crawford?"

"No," Crawford said.

The elderly tribal leader said, "Then I shall loan you mine." He hesitated momentarily, before adding, "Never before has hand other than mine wielded it." And finally, simply, "Never has it been drawn to commit dishonor."

"I am honored."

Outside, the rumors had spread fast and already a great arena was forming by the packed lines of Chaambra nomads. At the tent entrance, Elmer Allen, his face worried, said, his English in characteristic Jamaican accent, "What did you chaps do?"

"Duel," Abe growled apprehensively. "This joker here has challenged their top swordsman to a fight."

Elmer said hurriedly, "See here, gentlemen, the hovercraft are parked over behind that tent. We can be there in two minutes and away from —"

Crawford's eyes went from Elmer Allen to Abe Baker and then back again. He chuckled, "I don't think you two think I'm going to win this fight," he said.

"What do you know about swordsmanship?" Elmer Allen said accusingly.

"Practically nothing. A little bay-

onet practice quite a few years ago."

"Oh, great," Abe muttered.

Elmer said hurriedly, "See here, Homer, I was on the college fencing team and—"

Crawford grinned at him. "Too late, friend."

As they talked, they made their way to the large circle of men. In it's center, Abd-el-Kader was stripping to his waist, meanwhile laughingly shouting his confidence to his Ouled Touameur tribesmen and to the other Chaambra of fighting age. No one seemed to doubt the final issue. Beneath his white burnoose he wore a gandoura of lightweight woolen cloth and beneath that a longish undershirt of white cotton, similar to that of the Tuareg but with shorter and less voluminous sleeves. This the desert fighter retained.

Crawford stripped down too, nude to the waist. His body was in excellent trim, muscles bunching under the ebony skin. A Haratin servant came up bearing El Aicha's sword.

Homer Crawford pulled it from the scabbard. It was of scimitar type, the weapon which had once conquered half the known world.

From within the huge circle of men, Abd-el-Kader swung his own blade in flashing arcs and called out something undoubtedly insulting, but which was lost in the babble of the multitude.

"Well, here we go," Crawford grunted. "You fellows better station yourselves around just on the off chance that those Ouled Touameur bully-boys don't like the decision."

"We'll worry about that," Abe said unhappily. "You just see you get out of this in one piece. Anything happens to you and the head office'll make me head of this team—and frankly, man. I don't want the job."

Homer grinned at him, and began pushing his way through to the center.

The Arab cut a last swatch in the air, with his whistling blade and started forward, in practiced posture. Homer awaited him, legs spread slightly, his hands extended slightly, the sword held at the ready but with point low.

Abe Baker growled, unhappily, "He said he didn't know anything about swords, and the way he holds it bears him out. That Arab'll cut Homer to ribbons. Maybe we ought to do something about it." As usual, under stress, he'd dropped his beatnik patter.

Elmer Allen looked at him. "Such as what? There are at least three thousand of these tribesmen chaps here watching their favorite sport. What did you have in mind doing?"

Abd-el-Kader hadn't remained the victor of a score of similar duels through making such mistakes as underestimating his foe. In spite of the black stranger's seeming ignorance of his weapon, the Arab had no intention of being sucked into a trap. He advanced with care.

His sword darted forward, quickly, experimentally, and Homer Crawford barely caught its razor edge on his own.

Save for his own four companions, the crowd laughed aloud. None among them were so clumsy as this.

The Ouled Touameur chief was convinced. He stepped in fast, the blade flicked in and out in a quick feint, then flicked in again. Homer Crawford countered clumsily.

And then there was a roar as the American's blade left his hand and flew high in the air to come to the ground again a score of feet behind the desert swordsman.

For a brief moment Abd-el-Kader stepped back to observe his foe, and there was mockery in his face. "So thy manhood has been spat upon by one who fights only with his mouth! Almost, braggart, I am inclined to give you your life so that you may spend the rest of it in shame. Now die, unbeliever!"

Crawford stood hopelessly, in a semicrouch, his hands still slightly forward. The Arab came in fast, his sword at the ready for the death stroke.

Suddenly, the American moved forward and then jumped a full yard into the air, feet forward and into the belly of the advancing Arab. The heavily shod right foot struck at the point in the abdomen immediately below the sternum, the solar plexus, and the left was as low as the groin. In a motion that was almost a bounce off the other's body, Crawford came lithely back to his feet, jumped back two steps, crouched again.

But Abd-el-Kader was through, his eyes popping agony, his body writhing on the ground. The whole thing,

from the time the Arab had advanced on the disarmed man for the kill, hadn't taken five seconds.

His groans were the only sounds which broke the unbelieving silence of the Chaambra tribesmen. Homer Crawford picked up the fallen leader's sword and then strolled over and retrieved that of El Aicha. Ignoring Abd-el-Kader, he crossed to where the tribal elders had assembled to watch the fight and held out the borrowed sword to its owner.

El Aicha sheathed it while looking into Homer Crawford's face. "It has still never been drawn to commit dishonor."

"My thanks," Crawford said.

Over the noise of the crowd which now was beginning to murmur its incredulity at their champion's fantastic defeat, came the voice of Abe Baker swearing in Arabic and yelling for a way to be cleared for him. He was driving one of the hovercraft.

He drew it up next to the still agonized Abd-el-Kader and got out accompanied by Bey-ag-Akhamouk. Silently and without undue roughness they picked up the fallen clan chief and put him into the back of the hover-lorry, ignoring the crowd.

Homer Crawford came up and said in English, "All right, let's get out of here. Don't hurry, but on the other hand don't let's prolong it. One of those Ouled Touameur might collect himself to the point of deciding he ought to rescue his leader."

Abe looked at him disgustedly. "Like, where'd you learn that little party trick, man?"

Crawford yawned. "I said I didn't know anything about swords. You didn't ask me about judo. I once taught judo in the Marines."

"Well, why didn't you take him sooner? He like to cut your head off with that cheese knife before you landed on him."

"I couldn't do it sooner. Not until he knocked the sword out of my hand. Until then it was a sword fight. But as soon as I had no sword then in the eyes of every Chaambra present, I had the right to use any method possible to save myself."

Bey-ag-Akhamouk looked up at the sun to check the time. "We better speed it up if we want to get this man to Columb-Béchar and then get on down over the deser to Timbuktu and that meeting."

"Let's go," Homer said. The second hovercraft joined them, driven by Elmer Allen, and they made their way through the staring, but motionless, crowds of Chaambra.

IV

Once the city of Timbuktu was more important in population, in commerce, in learning than the London, the Paris or the Rome of the time. It was the crossroads where African traffic, east and west, met African traffic, north and south; Timbuktu dominated all. In its commercial houses accumulated the wealth of Africa; in its universities and mosques the wisdom of Greece, Rome, Byzantium and the Near East

—at a time when such learning was being destroyed in Dark Ages beset Europe.

Timbuktu's day lasted but two or three hundred years at most. By the middle of the Twentieth Century it had deteriorated into what looked nothing so much as a New Mexico ghost town, built largely of adobe. Its palaces and markets had melted away to caricatures of their former selves, its universities were a memory of yesteryear, its population fallen off to a few thousands. Not until the Nigger Projects, the dams and irrigation projects, of the latter part of the Twentieth Century did the city begin to regain a semblance of its old importance.

Homer Crawford's team had come down over the Tanezrouft route, Reggan, Bidon Cinq and Tessalit; that of Isobel Cunningham, Jacob Armstrong and Clifford Jackson, up from Timbuktu's Niger River port of Kabara. They met in the former great market square, bordered on two sides by the one time French Administration buildings.

Isobel reacted first. "Abe!" she yelled, pointing accusingly at him.

Abe Baker pretended to cringe, then reacted. "Isobel! Somebody *told* me you were over here!"

She ran over the heavy sand, which drifted through the streets, to the hovercraft in which he had just pulled up. He popped out to meet her, grinning widely.

"Why didn't you look me up?" she said accusingly, presenting a cheek to be kissed.

"In Africa, man?" he laughed. "Kinda big, Africa. Like, I didn't know if you were in the Sahara, or maybe down in Angola, or wherever."

She frowned. "Heaven forbid."

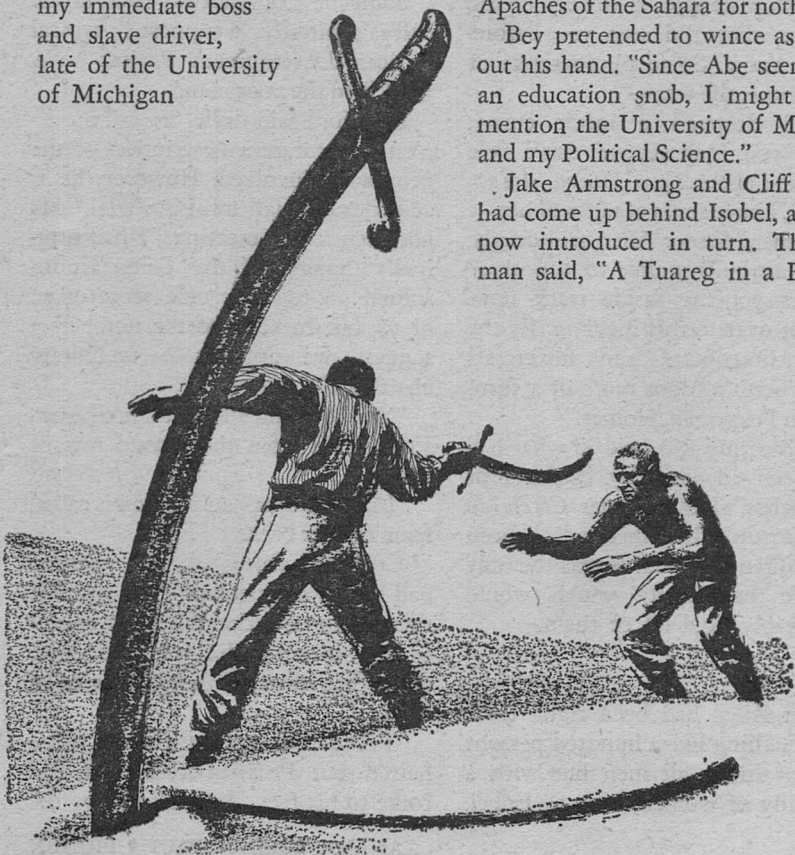
Abe turned to the others of his team who had crowded up behind him. It had been a long time since any of them had seen other than native women.

"Isobel," he said, "I hate to do this, but let me introduce you to Homer Crawford, my immediate boss and slave driver, late of the University of Michigan

where he must've found out where the body was—they gave him a doctorate. Then here's Elmer Allen, late of Jamaica—British West Indies, not Long Island—all he's got is a master's, also in sociology. And this is Kenneth Ballalou, hails from San Francisco, I don't think Kenny ever went to school, but he seems to speak every language ever." Abe turned to his final companion. "And this is our sole *real* African, Bey-ag-Akhamouk, of Tuareg blood, so beware, they don't call the Tuareg the Apaches of the Sahara for nothing."

Bey pretended to wince as he held out his hand. "Since Abe seems to be an education snob, I might as well mention the University of Minnesota and my Political Science."

Jake Armstrong and Cliff Jackson had come up behind Isobel, and were now introduced in turn. The older man said, "A Tuareg in a Reunited



Nations team? Not that it makes any difference to me, but I thought there was some sort of policy."

"I was taken to the States when I was three," Bey said. "I'm an American citizen."

Isobel was chattering, in animation, with Abe Baker. It developed they'd both been reporters on the school paper at Columbia. At least, they'd both started as reporters, Isobel had wound up editor.

Since their introduction, Homer Crawford had been vaguely frowning at her. Now he said, "I've been trying to place where I'd seen you before. Now I know. Some photographs of Lena Horne, she was—"

Isobel dropped a mock curtsy. "Thank you, kind sir, you don't have to tell me about Lena Horne, she's a favorite. I have scads of tapes of her."

"Brother," Elmer Allen said dourly, "how's anybody going to top that? Homer's got the inside track now. Let's get over to this meeting. By the cars, helio-copters and hovercraft around here, you got more of a turnout than I expected, Homer."

The meeting was held in what had once been an assembly chamber of the officials of the former *Cercle de Tombouctou*, when this had all been part of French Sudan. It was the only room in the vicinity which would comfortably hold all of them.

Elmer Allen had been right, there was something like a hundred persons present, almost all men but with a sprinkling of women, such as Isobel.

More than half were in native costume running the gamut from Nigeria to Morocco and from Mauritania to Ethiopia. They were a competent looking, confident voiced gathering.

Homer Crawford knocked with a knuckle on the table that stood at the head of the hall and called for silence. "Sorry we're late," he said, "Particularly in view of the fact that the idea of this meeting originated with my team. We had some difficulty with a nomad raider, up in Chaambra country."

Someone from halfway back in the hall said bitterly, "I suppose in typical African Development Project style, you killed the poor man."

Crawford said dryly, "*Poor man* isn't too accurate a description of the gentleman involved. However, he is at present in jail awaiting trial." He got back to the meeting. "I had originally thought of this being an informal get-together of a score or so of us, but in view of the numbers I suggest we appoint a temporary chairman."

"You're doing all right," Jake Armstrong said from the second row of chairs.

"I second that," an unknown called from farther back.

Crawford shrugged. His manner had a cool competence. "All right. If there is no objection, I'll carry on until the meeting decides, if it ever does, that there is need of elected officers."

"I object." In the third row a white haired but Prussian-erect man had come to his feet. "I wish to know the

meaning of this meeting. I object to it being held at all."

Abe Baker called to him, "Dad, how can you object to it being held if you don't know what it's for?"

Homer Crawford said, "Suppose I briefly sum up our mutual situation and if there are any motions to be made—including calling the meeting quits—or decisions to come to, we can start from there."

There was a murmur of assent. The objector sat down in a huff.

Crawford looked out over them. "I don't know most of you. The word of this meeting must have spread from one group or team to another. So what I'll do is start from the beginning, saying little at first with which you aren't already familiar, but we'll lay a foundation."

He went on. "This situation which we find in Africa is only a part of a world-wide condition. Perhaps to some, particularly in the Western World as they call it, Africa isn't of primary importance. But, needless to say, it is to we here in the field. Not too many years ago, at the same period the African colonies were bursting their bonds and achieving independence, an international situation was developing that threatened future peace. The rich nations were getting richer, the poor were getting poorer, and the rate of this change was accelerating. The reasons were various. The population growth in the backward countries, unhampered by birth control and rocketing upward due to new sanitation, new health measures, and the conquest of a score of diseases

that have bedeviled man down through the centuries, was fantastic. Try as they would to increase per capita income in the have-not nations, population grew faster than new industry and new agricultural methods could keep up. On top of that handicap was another; the have-not nations were so far behind economically that they couldn't get going. Why build a bicycle factory in Morocco which might be able to turn out bikes for, say, fifty dollars apiece, when you could buy them from automated factories in Europe, Japan or the United States for twenty-five dollars?"

Most of his audience were nodding agreement, some of them impatiently, as though wanting him to get on with it.

Crawford continued. "For a time aid to these backward nations was left in the hands of the individual nations—especially to the United States and Russia. However, in spite of speeches of politicians to the contrary, governments are not motivated by humanitarian purposes. The government of a country does what it does for the benefit of the ruling class of that country. That was the reason it was appointed the government. Any government that doesn't live up to this dictum soon stops being the government."

"That isn't always so," somebody called.

Homer Crawford grinned. "Bear with me a while," he said. "We can debate till the Niger freezes over—later on."

He went on. "For instance, the

United States would *aid* Country X with a billion dollars at, say, four per cent interest, stipulating that the money be spent in America. This is aid? It certainly is for American business. But then our friends the Russians come along and loan the same country a billion rubles at a very low interest rate and with supposedly no strings attached, to build, say, a railroad. Very fine indeed, but first of all the railroad, built Russian style and with Russian equipment, soon needs replacements, new locomotives, more rolling stock. Where must it come from? Russia, of course. Besides that, in order to build and run the railroad it became necessary to send Russian technicians to Country X and also to send students from Country X to Moscow to study Russian technology so that they could operate the railroad." Crawford's voice went wry. "Few countries, other than commie ones, much desire to have their students study in Moscow."

There was a slight stirring in his audience and Homer Crawford grinned slightly. "You'll pardon me if in this little summation, I step on a few ideological toes—of both East and West.

"Needless to say, under these conditions of *aid* in short order the economies of various countries fell under the domination of the two great colossi. At the same time the other have nations including Great Britain, France, Germany and the newly awakening China, began to realize

that unless they got into the *aid* act that they would disappear as competitors for the tremendous markets in the newly freed former colonial lands. Also along in here it became obvious that philanthropy with a mercenary basis doesn't always work out to the benefit of the receiver and the world began to take measures to administer aid more efficiently and through world bodies rather than national ones.

"But there was still another problem, particularly here in Africa. The newly freed former colonies were wary of the nations that had formerly owned them and often for good reason, always remembering that governments are not motivated by humanitarian reasons. England did not free India because her heart bled for the Indian people, nor did France finally free Algeria because the French conscience was stirred with thoughts of Freedom, Equality and Fraternity."

A voice broke in from halfway down the hall, a voice heavy with British accent. "I say, why did you Yanks free the Philippines?"

Homer Crawford laughed, as did several other Americans present. "That's the first time I've ever been called a Yankee," he said. "But the point is well taken. By freeing the islands we washed our hands of the responsibility of such expensive matters as their health and education, and at the same time we granted freedom we made military and economic treaties which perpetuated our fundamental control of the Philippines.

"The point is made. The distrust of the European and the white man as a whole was prevalent, especially here in Africa. However, and particularly in Africa, the citizens of the new countries were almost unbelievably uneducated, untrained, incapable of engineering their own destiny. In whole nations there was not a single lawyer or—"

"That's no handicap," somebody called.

There was laughter through the hall.

Homer Crawford laughed, too, and nodded as though in solemn agreement. "However, there were also no doctors, engineers, scientists. There were whole nations without a single college graduate."

He paused and his eyes swept the hall. "That's where we came in. Most of us here this afternoon are from the States, however, also represented to my knowledge are British West Indians, a Canadian or two, at least one Panamanian, and possibly some Cubans. Down in the southern part of the continent I know of teams working in the Portuguese areas who are Brazilian in background. All of us, of course, are Africans racially, but few if any of us know from what part of Africa his forebears came. My own grandfather was born a slave in Mississippi and didn't know his father; my grandmother was already a hopeless mixture of a score of African tribes.

"That, I assume, is the story of most if not all of us. Our ancestors were wrenched from the lands of their

birth and shipped under conditions worse than cattle to the New World." He added simply, "Now we return."

There was a murmur throughout his listeners, but no one interrupted.

"When the great powers of Europe arbitrarily split up Africa in the Nineteenth Century they didn't bother with race, tribe, nor even geographic boundaries. Largely they seemed to draw their boundary lines with ruler and pencil on a Mercator projection. Often, not only were native nations split in twain but even tribes and clans, and sometimes split not only one way but two or three. It was chaotic to the old tribal system. Of course, when the white man left various efforts were made from the very start to join that which had been torn apart a century earlier. Right here in this area, Senegal and what was then French Sudan merged to form the short-lived Mali Federation. Ghana and French Guinea formed a shaky alliance. More successful was the federation of Kenya, Tanganyika, Uganda and Zanzibar, which of course, has since grown.

"But there were fantastic difficulties. Many of the old tribal institutions had been torn down, but new political institutions had been introduced only in a half-baked way. African politicians, supposedly 'democratically' elected, had no intention of facing the possibility of giving up their individual powers by uniting with their neighbors. Not only had the Africans been divided tribally but now politically as well. But obviously, so long as they continued to be

Balkanized the chances of rapid progress were minimized.

"Other difficulties were manifold. So far as socio-economics were concerned, African society ran the scale from bottom to top. The Bushmen of the Ermelo district of the Transvaal and the Kalahari are stone age people still—savages. Throughout the continent we find tribes at an ethnic level which American Anthropologist Lewis Henry Morgan called barbarism. In some places we find socio-economic systems based on chattel slavery, elsewhere feudalism. In comparatively few areas, Casablanca, Algiers, Dakar, Cairo and possibly the Union we find a rapidly expanding capitalism.

"Needless to say, if Africa was to progress, to increase rapidly her per capita income; to depart the ranks of the have-nots and become have nations, these obstacles had to be overcome. That is why we are here."

"Speak for yourself, Mr. Crawford," the white haired objector of ten minutes earlier, bit out.

Homer Crawford nodded. "You are correct, sir. I should have said that is the reason the teams of the Re-united Nations African Development Project are here. I note among us various members of this project besides those belonging to my own team, by the way. However, most of you are under other auspices. We of the Re-united Nations teams are here because as Africans racially but not nationally, we have no affiliations with clan, tribe or African nation. We are free

to work for Africa's progress without prejudice. Our job is to remove obstacles wherever we find them. To break up log jams. To eliminate prejudices against the steps that must be taken if Africa is to run down the path of progress, rather than to crawl. We usually operate in teams of about half a dozen. There are hundreds of such teams in North Africa alone."

He rapped his knuckle against the small table behind which he stood. "Which brings us to the present and to the purpose of suggesting this meeting. Most of you are operating under other auspices than the Re-united Nations. Many of you duplicate some of our work. It occurred to me, and my team mates, that it might be a good idea for us to get together and see if there is ground for co-operation."

Jake Armstrong called out, "What kind of co-operation?"

Crawford shrugged. "How would I know? Largely, I don't even know who you represent, or the exact nature of the tasks you are trying to perform. I suggest that each group of us represented here, stand up and announce their position. Possibly, it will lead to something of value."

"I make that a motion," Cliff Jackson said.

"Second," Elmer Allen called out. The majority were in favor.

Homer Crawford sat down behind the table, saying, "Who'll start off?"

Armstrong said, "Isobel, you're better looking than I am. They'd rather look at you. You present our story."

Isobel came to her feet and shot

him a scornful glance. "Lazy," she said.

Jake Armstrong grinned at her. "Make it good."

Isobel took her place next to the table at which Crawford sat and faced the others.

She looked at the chairman from the side of her eyes and said, "After that allegedly *brief* summation Mr. Crawford made, I have a sneaking suspicion that we'll be here until next week unless I set a new precedent and cut the position of the Africa for Africans Association shorter."

Isobel got her laugh, including one from Homer Crawford, and went on.

"Anyway, I suppose most of you know of the AFAA and possibly many of you belong to it, or at least contribute. We've been called the African Zionist organization and perhaps that's not too far off. We are largely, but not entirely an American association. We send out our teams, such as the one my colleagues and I belong to, in order to speed up progress and, as our chairman put it, eliminate prejudices against the steps that must be taken if Africa is to run down the path of progress instead of crawl. We also advocate that Americans and other non-African-born Negroes, educated in Europe and the Americas, return to Africa to help in its struggles. We find positions for any such who are competent, preferably doctors, educators, scientists and technicians, but also competent mechanics, construction workers and so forth. We operate a school in New York where we teach native languages and

lingua franca such as Swahili and Songhai, in preparation for going to Africa. We raise our money largely from voluntary contributions, and largely from American Negroes although we have also had government grants, donations from foundations, and from individuals of other racial backgrounds. I suppose that sums it up."

Isobel smiled at them, returned to her chair to applause, probably due as much to her attractive appearance as her words.

Crawford said, "When we began this meeting we had an objection that it be held at all. I wonder if we might hear from that gentleman next?"

The white haired, ramrod erect, man stood next to his chair, not bothering to come to the head of the room. "You may indeed," he snapped. "I am Bishop Manning of the United Negro Missionaries, an organization attempting to accomplish the only truly important task that cries for completion on this largely godless continent. Accomplish this, and all else will fall into place."

Homer Crawford said, "I assume you refer to the conversion of the populace."

"I do indeed. And the work others do is meaningless until that has been accomplished. We are bringing religion to Africa, but not through white missionaries who in the past lived *off* the natives, but through Negro missionaries who live *with* them. I call upon all of you to give up your present occupations and come to our assistance."

Elmer Allen's voice was sarcastic. "These people need less superstition, not more."

The bishop spun on him. "I am not speaking of superstition, young man!"

Elmer Allen said, "All religions are superstitions, except one's own."

"And yours?" the Bishop barked. "I'm an agnostic."

The bishop snorted his disgust and made his way to the door. There he turned and had his last word. "All you do is meaningless. I pray you, again, give it up and join in the Lord's work."

Homer Crawford nodded to him. "Thank you, Bishop Manning. I'm sure we will all consider your words." When the older man was gone, he looked out over the hall again. "Well, who is next?"

A thus far speechless member of the audience, seated in the first row, came to his feet. His face was serious and strained, the face of a man who pushes himself beyond the point of efficiency in the vain effort to accomplish more by expenditure of added hours.

He came to the front and said, "Since I'm possibly the only one here who also has objections to the reason for calling this meeting, I might as well have my say now." He half turned to Crawford, and continued. "Mr. Chairman, my name is Ralph Sandell and I'm an officer in the Sahara Afforestation Project, which, as you know, is also under the auspices

of the Reunited Nations, though not having any other connection with your own organization."

Homer Crawford nodded. "We know of your efforts, but why do you object to calling this meeting?" He seemed mystified.

"Because, like Bishop Manning, I think your efforts misdirected. I think you are expending tremendous sums of money and the work of tens of thousands of good men and women, in directions which in the long run will hardly count."

Crawford leaned back in surprise, waiting for the other's reasoning.

Ralph Sandell obliged. "As the chairman pointed out, the problem of population explosion is a desperate one. Even today, with all the efforts of the Reunited Nations and of the individual countries involved in African aid, the population of this continent is growing at a pace that will soon outstrip the arable portion of the land. Save only Antarctica, Africa has the smallest arable percentage of land of any of the continents.

"The task of the Afforestation Project is to return the Sahara to the fertile land it once was. The job is a gargantuan one, but ultimately quite possible. Here in the south we are damming the Niger, running our irrigation projects farther and farther north. From the Mauritania area on the Atlantic we are pressing inland, using water purification and solar pumps to utilize the ocean. In the mountains of Morocco, the water available is being utilized more efficiently than ever before, and the

sands being pushed back. We are all familiar with Egypt's ever increasingly successful efforts to exploit the Nile. In the Sahara itself, the new solar pumps are utilizing wells to an extent never dreamed of before. The oases are increasing in a geometric progression both in number and in size." He was caught up in his own enthusiasm.

Crawford said, interestedly, "It's a fascinating project. How long do you estimate it will be before the job is done?"

"Perhaps a century. As the trees go in by the tens of millions, there will be a change in climate. Forest begets moisture, which in turn allows for more forest." He turned back to the audience as a whole. "In time we will be able to farm these million upon million of acres of fertile land. First it must go into forest, then we can return to field agriculture when climate and soil have been restored. This is our prime task! This is our basic need. I call upon all of you for your support and that of your organizations if you can bring their attention to the great need. The tasks you have set yourselves are meaningless in the face of this greater one. Let us be practical."

"Crazy man," Abe Baker said aloud. "Let's be practical and cut out all this jazz." The youthful New Yorker came to his feet. "First of all you just mentioned it was going to take a century, even though it's going like a geometric progression. Geometric progressions get going kind of slow, so I imagine that your scheme

for making the Sahara fertile again, won't really be under full steam until more than halfway through that century of yours, and not really ripping ahead until, maybe two thirds of the way. Meanwhile, what's going to happen?"

"I beg your pardon!" Ralph Sandell said stiffly.

"That's all right." Abe Baker grinned at him. "The way they figure, population doubles every thirty years, under the present rate of increase. They figure there'll be three billion in the world by 1990, then by 2020 there would be six billions, and in 2050, twelve billions and twenty-four by the time your century was up. Old boy, I suggest the addition of a Sahara of rich agricultural land a century from now wouldn't be of much importance."

"Ridiculous!"

"You mean me, or you?" Abe grinned. "I once read an article by Donald Kingsbury. It's reprinted these days because it finished off the subject once and for all. He showed with mathematical rigor that given the present rate of human population increase, and an absolutely unlimited technology that allowed instantaneous intergalactical transportation and the ability to convert anything and everything into food, including interstellar dust, stars, planets, everything, it would take only seven thousand years to turn the total mass of the total universe into human flesh!"

The Sahara Afforestation official gaped at him.

The room rocked with laughter.

Irritated, Sandell snapped again, "Ridiculous!"

"It sure is, man," Abe grinned. "And the point is that the job is educating the people and freeing them to the point where they can develop their potentialities. Educate the African and he will see the same need that does the intelligent European, American, or Russian for that matter, to limit our population growth." He sat down again, and there was a scattering of applause and more laughter.

Sandell, still glowering, took his seat, too.

Homer Crawford, who'd been hard put not to join in the amusement, said, "Thanks to both of you for some interesting points. Now, who's next? Who else do we have here?"

When no one else answered, a smallish man, dressed in the costume of the Dogon, to the south, came to his feet and to the head of the room.

In a clipped British accent, he said, "Rex Donaldson, of Nassau, the Bahamas, in the service of Her Majesty's Government and the British Commonwealth. I have no team. Although our tasks are largely similar to those of the African Development Project, we field men of the African Department usually work as individuals. My native pseudonym is usually Dolo Anah."

He looked out over the rest. "I have no objection to such meetings as this. If nothing else, it gives chaps a bit of an opportunity to air grievances. I personally have several and

may as well state them now. Among other things, it becomes increasingly clear that though some of the organizations represented here are supposedly of the Reunited Nations, actually they are dominated by Yankees. The Yankees are seeping in everywhere." He looked at Isobel. "Yes, such groups as your Africa for Africans Association has high flown slogans, but wherever you go, there go Yankee ideas, Yankee products, Yankee schools."

Homer Crawford's eyebrows went up. "What is your solution? The fact is that the United States has a hundred or more times the educated Negroes than any other country."

Donaldson said, doggedly, "The British Commonwealth has done more than any other element in bringing progress to Africa. She should be given the lead in developing the continent. A good first step would be to make the pound sterling legal tender throughout the continent. And, as things are now, there are some *seven hundred* different languages, not counting dialects. I suggest that English be made the lingua franca of—"

An excitable type, who had been first to join in the laughter at Sandell, now jumped to his feet. "*Un moment, Monsieur!* The French Community long dominated a far greater portion of Africa than the British flag flew over. Not to mention that it was the most advanced portion. If any language was to become the lingua franca of all Africa, French would be most suitable. Your ultimate purpose,

Mr. Donaldson, is obvious. You and your Commonwealth African Department wish to dominate for political and economic reasons!"

He turned to the others and spread his hands in a Gallic gesture. "I introduce myself, Pierre Dupaine, operative of the African Affairs sector of the French Community."

"Ha!" Donaldson snorted. "Getting the French out of Africa was like pulling teeth. It took donkey's years. And now look. This chap wants to bring them back again."

Crawford was knuckling the table. "Gentlemen, Gentlemen," he yelled. He finally had them quieted.

Wryly he said, "May I ask if we have a representative from the government of the United States?"

A lithe, inordinately well dressed young man rose from his seat in the rear of the hall. "Frederic Ostrander, C.I.A.," he said. "I might as well tell you now, Crawford, and you other American citizens here, this meeting will not meet with the approval of the State Department."

Crawford's eyes went up. "How do you know?"

The C.I.A. man said evenly, "We've already had reports that this conference was going to be held. I might as well inform you that a protest is being made to the Sahara Division of the African Development Project."

Crawford said, "I suppose that is your privilege, sir. Now, in accord with the reason for this meeting, can you tell us why your organization is

present in Africa and what it hopes to achieve?"

Ostrander looked at him testily. "Why not? There has been considerable infiltration of all of these African development organizations by subversive elements . . ."

"Oh, Brother," Cliff Jackson said. ". . . And it is not the policy of the State Department to stand idly by while the Soviet Complex attempts to draw Africa from the ranks of the free world."

Elmer Allen said disgustedly, "Just what part of Africa would you really consider part of the Free World?"

The C.I.A. man stared at him coldly. "You know what I mean," he rapped. "And I might add, we are familiar with your record, Mr. Allen."

Homer Crawford said, "You've made a charge which is undoubtedly as unpalatable to many of those present as it is to me. Can you substantiate it? In my experience in the Sahara there is little, if any, following of the Soviet Complex."

An agreeing murmur went through the room.

Ostrander bit out, "Then who is subsidizing this El Hassan?"

Rex Donaldson, the British Commonwealth man, came to his feet. "That was a matter I was going to bring up before this meeting."

Homer Crawford, fully accompanied by Abe Baker and the rest of their team, even Elmer Allen, burst into uncontrolled laughter.

« TO BE CONCLUDED »

Remember the

Alamo!

Toward sundown, in the murky drizzle, the man who called himself Ord brought Lieutenant colonel William Barrett Travis word that the Mexican light cavalry had completely invested Bexar, and that some light guns were being set up across the San Antonio River. Even as he spoke, there was a flash and bang from the west, and a shell screamed over the old mission walls. Travis looked worried.

"What kind of guns?" he asked.

"Nothing to worry about, sir," Ord said. "Only a few one-pounders, nothing of respectable siege caliber. General Santa Anna has had to move too fast for any big stuff to keep up." Ord spoke in his odd accent. After all, he was a Britainer, or some other kind of foreigner. But he spoke good Spanish, and he seemed to know everything. In the four or five days since he had appeared he had become very useful to Travis.

Frowning, Travis asked, "How many Mexicans, do you think, Ord?"

"Not more than a thousand, now," the dark-haired, blue-eyed young man said confidently. "But when the main body arrives, there'll be four, five thousand."

Travis shook his head. "How do you get all this information, Ord? You recite it like you had read it all some place—like it were history."

Ord merely smiled. "Oh, I don't know *everything*, colonel. That is why I had to come here. There is so much

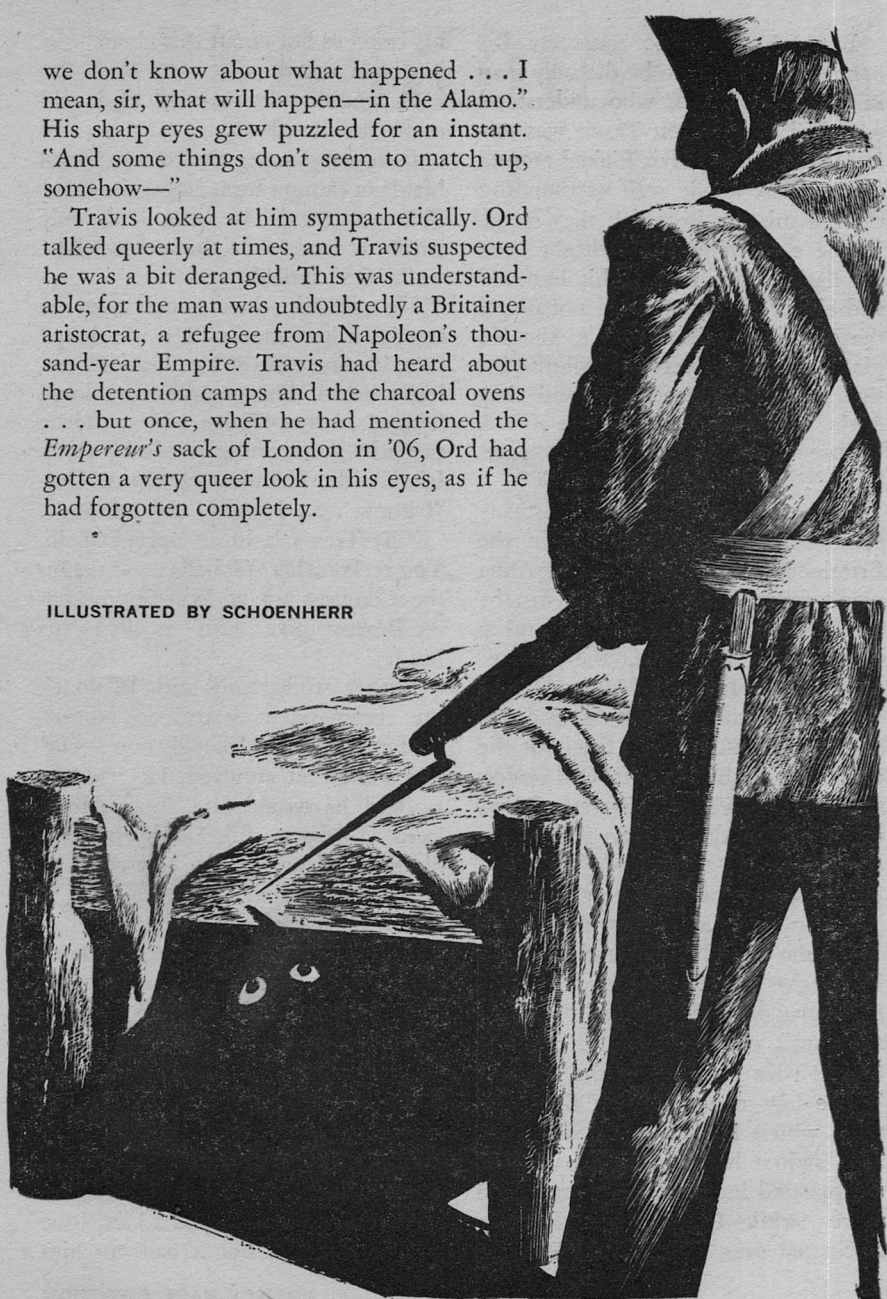
THIS IS, I THINK, ONE OF THE MOST POWERFUL COMMENTS ON THE MODERN SOCIAL PHILOSOPHY I HAVE SEEN — A REALLY BLOOD-CHILLING LITTLE TALE...

By R. R. FEHRENBACH

we don't know about what happened . . . I mean, sir, what will happen—in the Alamo." His sharp eyes grew puzzled for an instant. "And some things don't seem to match up, somehow—"

Travis looked at him sympathetically. Ord talked queerly at times, and Travis suspected he was a bit deranged. This was understandable, for the man was undoubtedly a Britainer aristocrat, a refugee from Napoleon's thousand-year Empire. Travis had heard about the detention camps and the charcoal ovens . . . but once, when he had mentioned the *Empereur's* sack of London in '06, Ord had gotten a very queer look in his eyes, as if he had forgotten completely.

ILLUSTRATED BY SCHOENHERR



But John Ord, or whatever his name was, seemed to be the only man in the Texas forces who understood what William Barrett Travis was trying to do. Now Travis looked around at the thick adobe wall surrounding the old mission in which they stood. In the cold, yellowish twilight even the flaring cook fires of his hundred and eighty-two men could not dispel the ghostly air that clung to the old place. Travis shivered involuntarily. But the walls were thick, and they could turn one-pounders. He asked, "What was it you called this place, Ord . . . the Mexican name?"

"The Alamo, sir." A slow, steady excitement seemed to burn in the Britainer's bright eyes. "Santa Anna won't forget that name, you can be sure. You'll want to talk to the other officers now, sir? About the message we drew up for Sam Houston?"

"Yes, of course," Travis said absently. He watched Ord head for the walls. No doubt about it, Ord understood what William Barrett Travis was trying to do here. So few of the others seemed to care.

Travis was suddenly very glad that John Ord had shown up when he did.

On the walls, Ord found the man he sought, broad-shouldered and tall in a fancy Mexican jacket. "The commandant's compliments, sir, and he desires your presence in the chapel."

The big man put away the knife with which he had been whittling. The switchblade snicked back and disappeared into a side pocket of the jacket, while Ord watched it with fascinated eyes. "What's old Bill got

his britches hot about this time?" the big man asked.

"I wouldn't know, sir," Ord said stiffly and oved on.

Bang-bang-bang roared the small Mexican cannon from across the river. *Pow-pow-pow!* The little balls only chipped dust from the thick adobe walls. Ord smiled.

He found the second man he sought, a lean man with a weathered face, leaning against a wall and chewing tobacco. This man wore a long, fringed, leather lounge jacket, and he carried a guitar slung beside his Rock Island rifle. He squinted up at Ord. "I know . . . I know," he muttered. "Willy Travis is in an uproar again. You reckon that colonel's commission the Congress up at Washington-on-the-Brazos give him swelled his head?"

Rather stiffly, Ord said, "Colonel, the commandant desires an officers' conference in the chapel, now." Ord was somewhat annoyed. He had not realized he would find these Americans so—distasteful. Hardly preferable to Mexicans, really. Not at all as he had imagined.

For an instant he wished he had chosen Drake and the Armada instead of this pack of ruffians—but no, he had never been able to stand sea sickness. He couldn't have taken the Channel, not even for five minutes.

And there was no changing now. He had chosen this place and time carefully, at great expense—actually, at great risk, for the X-4-A had aborted twice, and he had had a hard time bringing her in. But it had got him

here at last. And, because for a historian he had always been an impetuous and daring man, he grinned now, thinking of the glory that was to come. And he was a participant—much better than a ringside seat! Only he would have to be careful, at the last, to slip away.

John Ord knew very well how this coming battle had ended, back here in 1836.

He marched back to William Barrett Travis, clicked heels smartly. Travis' eyes glowed; he was the only senior officer here who loved military punctilio. "Sir, they are on the way."

"Thank you, Ord." Travis hesitated a moment. "Look, Ord. There will be a battle, as we know. I know so little about you. If something should happen to you, is there anyone to write? Across the water?"

Ord grinned. "No, sir. I'm afraid my ancestor wouldn't understand."

Travis shrugged. Who was he to say that Ord was crazy? In this day and age, any man with vision was looked on as mad. Sometimes, he felt closer to Ord than to the others.

The two officers Ord had summoned entered the chapel. The big man in the Mexican jacket tried to dominate the wood table at which they sat. He towered over the slender, nervous Travis, but the commandant, straight-backed and arrogant, did not give an inch. "Boys, you know Santa Anna has invested us. We've been fired on all day—" He seemed to be listening for something. *Wham!* Out-

side, a cannon split the dusk with flame and sound as it fired from the walls. "There is my answer!"

The man in the lounge coat shrugged. "What I want to know is what our orders are. What does old Sam say? Sam and me were in Congress once. Sam's got good sense; he can smell the way the wind's blowing." He stopped speaking and hit his guitar a few licks. He winked across the table at the officer in the Mexican jacket who took out his knife. "Eh, Jim?"

"Right," Jim said. "Sam's a good man, although I don't think he ever met a payroll."

"General Houston's leaving it up to me," Travis told them.

"Well, that's that," Jim said unhappily. "So what you figurin' to do, Bill?"

Travis stood up in the weak, flickering candlelight, one hand on the polished hilt of his saber. The other two men winced, watching him. "Gentlemen, Houston's trying to pull his militia together while he falls back. You know Texas was woefully unprepared for a contest at arms. The general's idea is to draw Santa Anna as far into Texas as he can, then hit him when he's extended, at the right place and right time. But Houston needs more time—Santa Anna's moved faster than any of us anticipated. Unless we can stop the Mexican Army and take a little steam out of them, General Houston's in trouble."

Jim flicked the knife blade in and out. "Go on."

"This is where we come in, gentlemen. Santa Anna can't leave a force of one hundred eighty men in his rear. If we hold fast, he must attack us. But he has no siege equipment, not even large field cannon." Travis' eye gleamed. "Think of it, boys! He'll have to mount a frontal attack, against protected American riflemen. Ord, couldn't your Englishers tell him a few things about that!"

"Whoa, now," Jim barked. "Billy, anybody tell you there's maybe four or five thousand Mexicaners comin'?"

"Let them come. Less will leave!"

But Jim, sour-faced turned to the other man. "Davey? You got something to say?"

"Hell, yes. How do we get out, after we done pinned Santa Anna down? You thought of that, Billy boy?"

Travis shrugged. "There is an element of grave risk, of course. Ord, where's the document, the message you wrote up for me? Ah, thank you." Travis cleared his throat. "Here's what I'm sending on to general Houston." He read, "Commandancy of the Alamo, February 24, 1836 . . . are you sure of the date, Ord?"

"Oh, I'm sure of that," Ord said.

"Never mind—if you're wrong we can change it later. 'To the People of Texas and all Americans in the World. Fellow Freemen and Compatriots! I am besieged with a thousand or more Mexicans under Santa Anna. I have sustained a continual bombardment for many hours but have not lost a man. The enemy has demanded

surrender at discretion, otherwise, the garrison is to be put to the sword, if taken. I have answered the demand with a cannon shot, and our flag still waves proudly over the walls. I shall never surrender or retreat. Then, I call on you in the name of liberty, of patriotism and everything dear to the American character—" He paused, frowning. "This language seems pretty old-fashioned, Ord—"

"Oh, no, sir. That's exactly right," Ord murmured.

" . . . To come to our aid with all dispatch. The enemy is receiving reinforcements daily and will no doubt increase to three or four thousand in four or five days. If this call is neglected, I am determined to sustain myself as long as possible and die like a soldier who never forgets what is due his honor or that of his homeland. VICTORY OR DEATH!"

Travis stopped reading, looked up. "Wonderful! Wonderful!" Ord breathed. "The greatest words of defiance ever written in the English tongue—and so much more literate than that chap at Bastogne."

"You mean to send that?" Jim gasped.

The man called Davey was holding his head in his hands.

"You object, Colonel Bowie?" Travis asked icily.

"Oh, cut that 'colonel' stuff, Bill," Bowie said. "It's only a National Guard title, and I like 'Jim' better, even though I am a pretty important man. Damn right I have an objection!

Why, that message is almost aggressive. You'd think we wanted to fight Santa Anna! You want us to be marked down as warmongers? It'll give us trouble when we get to the negotiation table—"

Travis' head turned. "Colonel Crockett?"

"What Jim says goes for me, too. And this: I'd change that part about all Americans, et cetera. You don't want anybody to think we think we're better than the Mexicans. After all, Americans are a minority in the world. Why not make it 'all men who love security?' That'd have world-wide appeal—"

"Oh, Crockett," Travis hissed.

Crockett stood up. "Don't use that tone of voice to me, Billy Travis! That piece of paper you got don't make you no better'n us. I ran for Congress twice, and won. I know what the people want—"

"What the people want doesn't mean a damn right now," Travis said harshly. "Don't you realize the tyrant is at the gates?"

Crockett rolled his eyes heavenward. "Never thought I'd hear a good American say that! Billy, you'll never run for office—"

Bowie held up a hand, cutting into Crockett's talk. "All right, Davey. Hold up. You ain't runnin' for Congress now. Bill, the main thing I don't like in your whole message is that part about victory or death. That's got to go. Don't ask us to sell that to the troops!"

Travis closed his eyes briefly. "Boys, listen. We don't have to tell

the men about this. They don't need to know the real story until it's too late for them to get out. And then we shall cover ourselves with such glory that none of us shall ever be forgotten. Americans are the best fighters in the world when they are trapped. They teach this in the Foot School back on the Chatahoochee. And if we die, to die for one's country is sweet—"

"Hell with that," Crockett drawled. "I don't mind dyin', but not for these big landowners like Jim Bowie here. I just been thinkin'—I don't own nothing in Texas."

"I resent that," Bowie shouted. "You know very well I volunteered, after I sent my wife off to Acapulco to be with her family." With an effort, he calmed himself. "Look, Travis. I have some reputation as a fighting man—you know I lived through the gang wars back home. It's obvious this Alamo place is indefensible, even if we had a thousand men."

"But we must delay Santa Anna at all costs—"

Bowie took out a fine, dark Mexican cigar and whittled at it with his blade. Then he lit it, saying around it, "All right, let's all calm down. Nothing a group of good men can't settle around a table. Now listen. I got in with this revolution at first because I thought old Emperor Iturbide would listen to reason and lower taxes. But nothin's worked out, because hot-heads like you, Travis, queered the deal. All this yammerin' about liberty! Mexico is a Republic, under an Emperor, not some kind of democracy,

and we can't change that. Let's talk some sense before it's too late. We're all too old and too smart to be wavin' the flag like it's the Fourth of July. Sooner or later, we're goin' to have to sit down and talk with the Mexicans. And like Davey said, I own a million hectares, and I've always paid minimum wage, and my wife's folks are way up there in the Imperial Government of the Republic of Mexico. That means I got influence in all the votin' groups, includin' the American Immigrant, since I'm a minority group member myself. I think I can talk to Santa Anna, and even to old Iturbide. If we sign a treaty now with Santa Anna, acknowledge the law of the land, I think our lives and property rights will be respected—" He cocked an eye toward Crockett.

"Makes sense, Jim. That's the way we do it in Congress. Compromise, everybody happy. We never allowed ourselves to be led nowhere we didn't want to go, I can tell you! And Bill, you got to admit that we're in better bargaining position if we're out in the open, than if old Santa Anna's got us penned up in this old Alamo."

"Ord," Travis said despairingly. "Ord, you understand. Help me! Make them listen!"

Ord moved into the candlelight, his lean face sweating. "Gentlemen, this is all wrong! It doesn't happen this way—"

Crockett sneered, "Who asked you, Ord? I'll bet you ain't even got a poll tax!"

Decisively, Bowie said, "We're free men, Travis, and we won't be led around like cattle. How about it, Davey? Think you could handle the rear guard, if we try to move out of here?"

"Hell, yes! Just so we're movin'!"

"O.K. Put it to a vote of the men outside. Do we stay, and maybe get croaked, or do we fall back and conserve our strength until we need it? Take care of it, eh, Davey?"

Crockett picked up his guitar and went outside.

Travis roared, "This is insubordination! Treason!" He drew his saber, but Bowie took it from him and broke it in two. Then the big man pulled his knife.

"Stay back, Ord. The Alamo isn't worth the bones of a Britainer, either."

"Colonel Bowie, please," Ord cried. "You don't understand! You *must* defend the Alamo! This is the turning point in the winning of the west! If Houston is beaten, Texas will never join the Union! There will be no Mexican War. No California, no nation stretching from sea to shining sea! This is the Americans' manifest destiny. You are the hope of the future . . . you will save the world from Hitler, from Bolshevism—"

"Crazy as a hoot owl," Bowie said sadly. "Ord, you and Travis got to look at it both ways. We ain't all in the right in this war—we Americans got our faults, too."

"But you are free men," Ord whispered. "Vulgar, opinionated, brutal—but free! You are still better than any

breed who kneels to tyranny—”

Crockett came in. “O.K., Jim.”

“How’d it go?”

“Fifty-one per cent for hightailin’ it right now.”

Bowie smiled. “That’s a flat majority. Let’s make tracks.”

“Comin’, Bill?” Crockett asked.

“You’re O.K., but you just don’t know how to be one of the boys. You got to learn that no dog is better’n any other.”

“No,” Travis croaked hoarsely. “I stay. Stay or go, we shall all die like dogs, anyway. Boys, for the last time! Don’t reveal our weakness to the enemy—”

“What weakness? We’re stronger than them. Americans could whip the Mexicans any day, if we wanted to. But the thing to do is make ’em talk, not fight. So long, Bill.”

The two big men stepped outside. In the night there was a sudden clatter of hoofs as the Texans mounted and rode. From across the river came a brief spatter of musket fire, then silence. In the dark, there had been no difficulty in breaking through the Mexican lines.

Inside the chapel, John Ord’s mouth hung slackly. He muttered, “Am I insane? It didn’t happen this way—it couldn’t! The books can’t be *that* wrong—”

In the candlelight, Travis hung his head. “We tried, John. Perhaps it was a forlorn hope at best. Even if we had defeated Santa Anna, or delayed him, I do not think the Indian Nations would have let Houston get help from the United States.”

Ord continued his dazed muttering, hardly hearing.

“We need a contiguous frontier with Texas,” Travis continued slowly, just above a whisper. “But we Americans have never broken a treaty with the Indians, and pray God we never shall. *We* aren’t like the Mexicans, always pushing, always grabbing off New Mexico, Arizona, California. *We* aren’t colonial oppressors, thank God! No, it wouldn’t have worked out, even if we American immigrants had secured our rights in Texas—” He lifted a short, heavy, percussion pistol in his hand and cocked it. “I hate to say it, but perhaps if we hadn’t taken Payne and Jefferson so seriously—if we could only have paid lip service, and done what we really wanted to do, in our hearts . . . no matter. I won’t live to see our final disgrace.”

He put the pistol to his head and blew out his brains.

Ord was still gibbering when the Mexican cavalry stormed into the old mission, pulling down the flag and seizing him, dragging him before the resplendent little general in green and gold.

Since he was the only prisoner, Santa Anna questioned Ord carefully. When the sharp point of a bayonet had been thrust half an inch into his stomach, the Britainer seemed to come around. When he started speaking, and the Mexicans realized he was English, it went better with him. Ord was obviously mad, it seemed to Santa Anna, but since he

spoke English and seemed educated, he could be useful. Santa Anna didn't mind the raving; he understood all about Napoleon's detention camps and what they had done to Britainers over there. In fact, Santa Anna was thinking of setting up a couple of those camps himself. When they had milked Ord dry, they threw him on a horse and took him along.

Thus John Ord had an excellent view of the battlefield when Santa Anna's cannon broke the American lines south of the Trinity. Unable to get his men across to safety, Sam Houston died leading the last, desperate charge against the Mexican regulars. After that, the American survivors were too tired to run from the cavalry that pinned them against the flooding river. Most of them died there. Santa Anna expressed complete indifference to what happened to the Texans' women and children.

Mexican soldiers found Jim Bowie hiding in a hut, wearing a plain linen tunic and pretending to be a civilian. They would not have discovered his identity had not some of the Texan women whom the cavalry had captured cried out, "Colonel Bowie—Colonel Bowie!" as he was led into the Mexican camp.

He was hauled before Santa Anna, and Ord was summoned to watch. "Well, don Jaime," Santa Anna remarked, "You have been a foolish man. I promised your wife's uncle to send you to Acapulco safely, though of course your lands are forfeit. You understand we must have lands for the veterans' program when this cam-

paign is over—" Santa Anna smiled then. "Besides, since Ord here has told me how instrumental you were in the abandonment of the Alamo, I think the Emperor will agree to mercy in your case. You know, don Jaime, your compatriots had me worried back there. The Alamo might have been a tough nut to crack . . . pues, no matter."

And since Santa Anna had always been broadminded, not objecting to light skin or immigrant background, he invited Bowie to dinner that night.

Santa Anna turned to Ord. "But if we could catch this rascally war criminal, Crockett . . . however, I fear he has escaped us. He slipped over the river with a fake passport, and the Indians have interned him."

"Si, Señor Presidente," Ord said dully.

"Please, don't call me that," Santa Anna cried, looking around. "True, many of us officers have political ambitions, but Emperor Iturbide is old and vain. It could mean my head—"

Suddenly, Ord's head was erect, and the old, clear light was in his blue eyes. "Now I understand!" he shouted. "I thought Travis was raving back there, before he shot himself—and your talk of the Emperor! American respect for Indian rights! Jeffersonian form of government! Oh, those ponces who peddled me that X-4-A—the *track jumper*! I'm not back in my own past. I've jumped the time track—I'm back in a screaming *alter-nate*!"

"Please, not so loud, *Senor* Ord." Santa Anna sighed. "Now, we must shoot a few more American officers, of course. I regret this, you understand, and I shall no doubt be much criticized in French Canada and Russia, where there are still civilized values. But we must establish the Republic of the Empire once and for all upon this continent, that aristocratic tyranny shall not perish from the earth. Of course, as an Englishman, you understand perfectly, *Señor* Ord."

"Of course, excellency," Ord said.

"There are soft hearts—soft heads, I say—in Mexico who cry for civil rights for the Americans. But I must make sure that Mexican dominance is never again threatened north of the Rio Grande."

"*Seguro*, excellency," Ord said, suddenly. If the bloody X-4-A had jumped the track, there was no getting back, none at all. He was stuck here. Ord's blue eyes narrowed. "After all, it . . . it is manifest destiny that the Latin peoples of North America meet at the center of the continent. Canada and Mexico shall share the Mississippi."

Santa Anna's dark eyes glowed. "You say what I have often thought.

You are a man of vision, and much sense. You realize the *Indios* must go, whether they were here first or not. I think I will make you my secretary, with the rank of captain."

"*Gracias*, Excellency."

"Now, let us write my communique to the capital, *Capitán* Ord. We must describe how the American abandonment of the Alamo allowed me to press the traitor Houston so closely he had no chance to maneuver his men into the trap he sought. *Ay, Capitán*, it is a cardinal principle of the Anglo-Saxons, to get themselves into a trap from which they must fight their way out. This I never let them do, which is why I succeed where others fail . . . you said something, *Capitán*?"

"*Sí*, Excellency. I said, I shall title our communique: 'Remember the Alamo,'" Ord said, standing at attention.

"*Bueno!* You have a gift for words. Indeed, if ever we feel the *gringos* are too much for us, your words shall once again remind us of the truth!" Santa Anna smiled. "I think I shall make you a major. You have indeed coined a phrase which shall live in history forever! ■

In Case You're Still Wondering . . .

That "historical record" tombstone we had in the October 1961 issue represented one of the lovely goofs that practically everyone looks at and can't see. The year in question was not a leap year, and certainly not a double-barreled leap-year. February never had so many days!

■ (From "Vogarian Revised Encyclopedia":

SAINTS: Golden Saints, properly, Yellow Saints, a term of contempt applied by the Vogarian State Press to members of the Church Of The Golden Rule because of their opposition to the war then being planned against Alkoria. See CHURCHES.

CHURCH, GOLDEN RULE, OF THE: A group of reactionary fanatics who resisted State control and advocated social chaos through "Individual Freedom." They were liquidated in the Unity Purge but for two-thousand of the more able-bodied, who were sentenced to the moon mines of Belen Nine. The prison ship never arrived there and it is assumed that the condemned Saints somehow overpowered the guards and escaped to some remote section of the galaxy.)

■ Kane had observed Commander Y'Nor's bird-of-prey profile with detached interest as Y'Nor jerked his head around to glare again at the chronometer on the farther wall of the cruiser's command room.

"What's keeping Dalon?" Y'Nor demanded, transferring his glare to Kane. "Did you assure him that I have all day to waste?"

"He should be here any minute, sir," Kane answered.

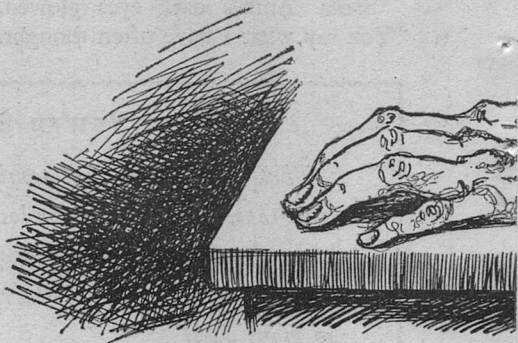
"I didn't find the Saints, after others had failed for sixty years, to then sit and wait. The situation on Vogar was already very critical when we left." Y'Nor scowled at the chronometer again. "Every hour we waste

the helpful hand of god

... Can be very helpful indeed. But, of course, it's long been known that God helps those who wisely help themselves...

BY TOM GODWIN

ILLUSTRATED BY BARBERIS





waiting here will delay our return to Vogar by an hour—I presume you realize that?”

“It does sound like a logical theory,” Kane agreed.

Y’Nor’s face darkened dangerously. “You will—”

Quick, hard-heeled footsteps sounded in the corridor outside. The guard officer, Dalon, stepped through the doorway and saluted; his eyes like ice under his pale brows and his uniform seeming to bristle with weapons.

“The native is here, sir,” he said to Y’Nor.

He turned, and made a commanding gesture. The leader of the Saints appeared; the man whose resistance Y’Nor would have to break.

A frail, white-bearded old man, scuffed uncertainly into the room in straw sandals, his faded blue eyes peering nearsightedly toward Y’Nor.

“Go to the commander’s desk,” Dalon ordered in his metallic tones.

The old man obeyed and stopped before Y’Nor’s desk, his hands clasped together as though to hide their trembling.

“You are Brenn,” Y’Nor said, “and you hold, I believe, the impressive titles of Chief Executive of the Council Of Provinces and Supreme Elder of the Churches Of The Golden Rule?”

“Yes, sir.” There was a faint quaver in old Brenn’s voice. “I welcome you to our world, sir, and offer you our friendship.”

“I understand you can produce Elusium X fuel?”

“Yes, sir. Our Dr. Larue told me the process is within our ability. We—” He hesitated. “We know you haven’t enough fuel to return to Vogar.”

Y’Nor stiffened in his chair. “What makes you think that?”

“It requires a great deal of fuel to get through the Whirlpool star cluster—and even sixty years ago, the Elusium ores of Vogar were almost exhausted.”

Y’Nor smiled thinly. “That reminds me—you would be one of the Saints who murdered their guards and stole a ship to get here.”

“We killed no guards, sir. In fact, all of them eventually joined our church.”

“Where is the ship?”

“We had to cut it up for our start in mechanization.”

“I presume you know you will pay for it?”

“It was taking us to our deaths in the radium mines—but we will pay whatever you ask.”

“The first installment will be one thousand units of fuel, to be produced with the greatest speed possible.”

“Yes, sir. But in return”—the old man stood a little straighter and an underlying resolve was suddenly revealed—“you must recognize us as a free race.”

“Free? A colony founded by escaped criminals?”

“That is not true! We committed no crime, harmed no living thing . . .”

The hard, cold words of Y’Nor cut off his protest:

"This world is now a Vogarian possession. Every man, woman, and child upon it is a prisoner of the Vogarian State. There will be no resistance. This cruiser's disintegrators can destroy a town within seconds, your race within hours. Do you understand what I mean?"

The visible portion of old Brenn's face turned pale. He spoke at last in the bitter tones of frightened, stubborn determination:

"I offered you our friendship; I hoped you would accept, for we are a peaceful race. I should have known that you came only to persecute and enslave us. But the hand of God will reach down to help us and—"

Y'Nor laughed, a raucous sound like the harsh caw of the Vogarian vulture, and held up a hairy fist.

"This, old man, is the hand for you to center your prayers around. I want full-scale fuel production commenced within twenty-four hours. If this is done, and if you continue to unquestioningly obey all my commands, I will for that long defer your punishment as an escaped criminal. If this is not done, I will destroy a town exactly twenty-five hours from now—and as many more as may be necessary. And you will be publicly executed as a condemned criminal and an enemy of the Vogarian State."

Y'Nor turned to Dalon. "Take him away."

Scared sheep," Y'Nor said when Brenn was gone. "Tomorrow he'll say that he prayed and his god told him

what to do—which will be to save his neck by doing as I command."

"I don't know—" Kane said doubtfully. "I think you're wrong about his conscience folding so easily."

"*You* think?" Y'Nor asked. "Perhaps I should remind you that the ability to think is usually characteristic of commanders rather than subensigns. You will not be asked to try to think beyond the small extent required to comprehend simple commands."

Kane sighed with weary resignation. An unexpected encounter with an Alkorian battleship had sent the Vogarian cruiser fleeing through the unexplored Whirlpool star cluster—Y'Nor and Kane the two surviving commissioned officers—with results of negative value to those most affected: the world of the Saint had been accidently discovered and he, Kane, had risen from subensign to the shakily temporary position of second-in-command.

Y'Nor spoke again:

"Since Vogarian commanders do not go out and mingle with the natives of a subject world, you will act as my representative. I'll let Brenn sweat until tomorrow, then you will go see him. In that, and in all subsequent contacts with the natives, you will keep in mind the fact that I shall hold you personally responsible for any failure of my program."

The next afternoon, two hours before the deadline, Kane went out into the sweet spring air of the world the Saints had named Sanctuary.

It was a virgin world, rich in the resources needed by Vogar, with twenty thousand Saints as the primary labor supply. It was also, he thought, a green and beautiful world; almost a familiar world. The cruiser stood at the upper edge of the town and in the late afternoon sun the little white and brown houses were touched with gold, half hidden in the deep azure shadows of the tall trees and flowering vines that bordered the gently curving streets.

Restlessness stirred within him as he looked at them. It was like going back in time to the Lost Islands, that isolated little region of Vogar that had eluded collectivization until the year he was sixteen. It had been at the same time of year, in the spring, that the State Unity forces had landed. The Lost Island villages had been drowsing in the sun that afternoon, as this town was drowsing now—

He forced the memories from his mind, and the futile restlessness they brought, and went on past a golden-spired church to a small cottage that was almost hidden in a garden of flowers and giant silver ferns.

Brenn met him at the door, his manner very courteous, his eyes dark-shadowed with weariness as though he had not slept for many hours, and invited him inside.

When they were seated in the simply-furnished room, Brenn said, "You came for my decision, sir?"

"The commander sent me for it."

Brenn folded his thin hands, which seemed to have the trembling sometimes characteristic of the aged.

"Yesterday evening, when I came from the ship, I prayed for guidance and I saw that I could only abide by the Golden Rule: *Do unto others as you would have them do unto you.*"

"Which means," Kane asked, "that you will do what?"

"Should we of the Church be stranded upon an alien world, our fuel supply almost gone, we would ask for help. By our own Golden Rule we can do no less than give it.

"Eighteen hours ago I issued the order for full-scale, all-out fuel production. I've been up all night and day checking the operation."

Kane stared, surprised that Y'Nor should have so correctly predicted Brenn's reaction. He tried to see some change in the old man, some evidence of the personal fear that must have broken him so quickly, but there was only weariness, and a gentleness.

"So much fuel—" Brenn said. "Is Vogar still at war with Alkoria?"

Kane nodded.

"Once I saw some Alkorian prisoners of war on Vogar," Brenn said. "They are a peaceful, doglike race. They never wanted to go to war with Vogar."

Well—they still didn't want war but on Alkoria were Elusium ores and other resources that the Vogarian State had to have before it could carry out its long-frustrated ambition of galactic conquest.

"I'll go, now," Kane said, getting out of his chair, "and see what you're having done. The commander doesn't take anybody's word for anything."

Brenn called a turbo-car and driver to take him to the multi-purpose factory, which was located a short distance beyond the other side of town. The driver stopped before the factory's main office, where a plump, bald man was waiting; his scalp and glasses gleaming in the sunshine.

"I'm Dr. Larue, sir," he greeted Kane. He had a face that under normal circumstances would have been genial. "Father Brenn said you were coming. I'm at your service, to show you what we're doing."

They went inside the factory, where the rush of activity was like a beehive. Machines and installations not needed for fuel production were being torn out as quickly as possible, others taking their place. The workers—he craned his neck to verify his astonished first-impression.

All of them were women.

"Father Brenn's suggestion," Larue said. "These girls are as competent as men for this kind of work and their use here permits the release of men to the outer provinces to procure the raw materials. As you know, our population is small and widely scattered—"

A crash sounded as a huge object nearby toppled and fell. Kane took an instinctive backward step, and bumped into something soft.

"Oh . . . excuse me, sir!"

He turned, and had a confused vision of an apologetic smile in a pretty young face, of red curls knocked into disarray—and of amazingly short shorts and a tantalizingly wispy halter.

She recovered the notebook she had dropped and hurried on, leaving a faint cloud of perfume in her wake and a disturbing memory of curving, golden-tan legs and a flat little stomach that had been exposed both north and south to the extreme limits of modesty.

"A personnel supervisor from Beachville," Larue said. "She was sunbathing when the plane arrived to pick her up and had no time to obtain other clothing. Father Brenn very firmly insisted upon losing not one minute of time during this emergency."

A crane rumbled into view and its grapples seized the huge object that had fallen.

"Our central air-conditioning unit," Larue said. "It had to go."

"You're putting something else in its place, of course?"

"Oh, yes. We must have more space but Father Brenn opposed the plan of building an annex as too dangerously time consuming. The only alternative is to tear out everything not absolutely essential."

Kane left shortly afterward, satisfied that the Saints were doing as Brenn had said.

He went back out in the spring sunshine where the turbo-car was still waiting for him, debated briefly with himself, and dismissed the driver. After so many weeks in the prison-like ship, it would be pleasant to walk again.

A grassy, tree-covered ridge ran like the swell of a green sea between



the plant and the town. He stopped on top of it, where the town was almost hidden from view, and looked out across the wide valley. Shadows moved lazily across it as cotton-puff clouds drifted down the blue dome of the sky, great white birds like swans were soaring overhead, calling to one another in voices like the singing of violins, bringing again the memories of the Lost Islands—

"And the Vogarian lord gazed upon his world and found it good!"

He swung around, his hand dropping to his holstered blaster, and looked into the green, mocking eyes of a tawny-haired girl. She was beautiful, in the savage way that the hill leopards of Vogar were beautiful, and her hand was on a pistol in her belt.

Her eyes flickered from his blaster up to his face, bright with challenge.

"Want to try it?" she asked.

She wore a short skirt of some rough material and her knees were dusty, as though she had walked for a long way. These things he noticed only absently, his eyes going back to the bold, beautiful face. For twenty years he had been accustomed to the women of Vogar; colorless in their Party uniforms and men's haircuts, made even more drab by the masculine mannerisms they affected. Not since the spring the Lost Islands died had he seen a girl like the one before him.

"Well?" she asked. "Do you think you'll know me next time?"

He walked to her, while she watched him with catlike wariness.

"Hand me that pistol," he ordered.

"Try to take it, you Vogarian ape!"

He moved, and a moment later she was sitting on the ground, her eyes wide with dismayed surprise as he shoved the pistol in his own belt.

"Resisting a Vogarian with a deadly weapon calls for the death penalty," he said. "I suppose you know what I can do?"

She got up, defiance like a blaze about her.

"I'll tell you what you can do—you can go to hell!"

The thought came to him that there might be considerable pleasure in laying her over his knee and raising some blisters where they would do her the most good. He regretfully dismissed the idea as too undignified for even a subensign and asked:

"Who are you, and what are you doing here with that pistol?"

She hesitated, then answered with insolent coolness:

"My name is Barbara Loring. I heard that you Vogarians had demanded that we agree to a surrender. I came down from the hills to disagree."

"Is a resistance force meeting here?"

"Do you think you could make me tell you?"

"There are ways—but I'm not here to use them. I am not your enemy."

A little of the hostility faded from her face and she asked, "But how could a Vogarian ever not be our enemy?"

He could find no satisfactory answer to the question.

"I can tell you this," she said. "I

know of no resistance organization. I can also tell you that we're not the race of cowards you think and we'll fight the instant Father Brenn gives the word."

"For one who speaks respectfully of Brenn," he said, "your recent words and actions weren't very religious and refined."

Fire flashed in the green eyes again. "Up in the Azure Mountains, where I come from, we're not very refined and we like being that way!"

"And why do you carry guns?" he asked.

"Because all along our frontier lines are rhino-stags, cliff bears, thunder hawks, and a lot of other overgrown carnivora that don't like us—that's why."

"I see." He took the pistol from his belt and held it out to her. "Go back to your mountains, where you belong, before you do something to get yourself executed."

Y'Nor, waiting impatiently in the ship, was grimly pleased by the news of Brenn's change of attitude.

"Exactly as I predicted, as you no doubt recall. How long until they can have a thousand units of fuel produced?"

"Larue estimated fourteen days at best."

Y'Nor tapped his thick fingers on his desk, scowling thoughtfully. "As little as seven extra days might force Vogar to accept the Alkorian peace terms because of lack of fuel—the natives can work twice as hard as they

expected to. Tell old Brenn they will be given exactly seven days from sunrise tomorrow.

"And summon Dalon and Graver. I want them to make use of every man on the ship for a twenty-four hour guard-and-inspection system in the plant. The natives will get no opportunities for stalling or sabotage."

Brenn was writing at his book-laden table when Kane went into his cottage the next morning.

"These are called edicts," Brenn said, after greeting him, "but I possess no law-making powers and they are really only suggestions."

Brenn shoved the paper to one side. The script was somewhat different from that of Vogar.

The Vogarian inspection and guard system is no more than an expected precaution against sabotage. The Vogarians must be regarded as potential friends who now treat us with suspicion and arrogance only because they do not yet realize the sincerity of our desire to help them to any extent short of surrender—

Kane looked up from the uncompleted, surprisingly humble, edict and Brenn asked:

"Your commander, sir—he is now pleased with our actions?"

"Not exactly. He will disintegrate a town seven days from sunrise this morning if all the fuel isn't produced by then."

"Seven—only seven days?" There was startled disbelief on Brenn's face. "But how can he expect us to produce so much fuel in so short a time?"

"I don't know. I'm sorry—it's something I would have argued against if I hadn't had too much sense to try."

"Seven days—" Brenn said again. "We can only pray that God will let it be time enough."

Kane walked on to the plant. The hilltop where he had met the girl was deserted and he felt a vague disappointment.

The plant was hot without the air-conditioner, especially in the vicinity of the electronic roasters. The girls looked flushed and uncomfortable, but for the redhead who still wore her scanty sunsuit. The armed Vogarians looked incongruously out of place among the girls and were sweating profusely. Kane made a mental note to have them ordered into tropical uniforms.

He found Dalon prowling like a wolf among his guards.

"It's inconceivable that these women could ever be a menace," Dalon said, "but I'm taking no chances."

He saw Graver, the cruiser's Chief Technician; a thin, dry man who seemed to be as emotionless as the machines and electronic circuits that were his life.

"They're doing everything with astonishing competence," Graver said. "My technicians are watching like hawks, though."

Larue was not in his office. His secretary, a brown-eyed woman of strikingly intelligent appearance, said, "I'm sorry, sir—Dr. Larue had to go back to town for a few minutes. May I give him your message?"

"No, thanks," he said. "Father Brenn is probably performing that unpleasant chore right now."

Since Dalon and Graver seemed to have the situation at the plant well in hand, Kane decided to make a tour of the outer provinces where the ores were being mined. An efficient plant would be worthless if it did not receive sufficient ore.

He spent four days on the inspection tour; much longer than he had expected to be gone but made necessary by the fact that the small Elusium mines were widely scattered in rugged, roadless areas and he had to walk most of the distance. The single helicopter on Sanctuary was being used to fly the ore out but it was operating on a schedule that caused him to miss it each time.

Each mine was being worked by full day-and-night crews; in fact, by more men than necessary. The reason for that, and for the way the men silently withheld their hostility, was made apparent in a bit of conversation between two miners that he overheard one day:

"... So why all of us here when not this many are needed?"

"They say Father Brenn wanted to get all the men out of town, away from the cruiser, so there would be no trouble—and you know there would have been if we had stayed. He wants to get the cruiser on its way back to Vogar, they say, so we can get busy producing weapons to fight the Occupation force ..."

He returned on the fifth evening of the allotted seven days and stopped by Brenn's cottage before going on to the ship. The old man was working in his garden, his trembling hands trying to tie up a red-flowered vine.

Kane tied it for him and he said, "Thank you, sir. Did you find the mining to be as I had said?"

"I found more than that. You know, don't you, that Y'Nor will return with the Occupation force a hundred days after leaving here?"

"Yes—I know that that is his intention."

"I understand that you're going to try to build weapons while he's gone. Don't, if you think anything of your people, let them do it. Nothing you could build in a hundred days would last a minute against a cruiser's disintegrators."

"I know," Brenn said. "We are supposed to choose between bloody, hopeless resistance and eternal slavery, aren't we? But why should either fate befall a peaceful race?"

Kane asked the logical question: "Why shouldn't it?"

"The laws of God have always been laws of justice and mercy. Not even the Vogarian State can change them."

He thought of the way the State had changed the Lost Islands in one bloody, violent afternoon. Brenn, watching his face, said:

"You are skeptical and bitter, my son—but you will learn that a harmless old man can speak with wisdom."

"No," he said. "There is neither justice nor mercy in the universe. I know from experience. A man can

only choose between the lesser of two evils—and almost anything is less evil than Y'Nor when he's mad."

He went to the plant the next morning. Inside, wherever he looked, he saw girls in shorts and halters. The place seemed to be alive with partially clad women. He went to the nearest bulletin board and read Brenn's edict of four days before:

Since the excessively warm temperature of the plant causes much discomfort and thereby impairs the efficiency of all workers, and since maximum efficiency will be required to produce the fuel in the extremely short time permitted us, it is suggested that the cool sunsuits of the Beachville girls become the standard work uniform until further notice. These may be obtained for the asking in Department 5-A.

The next day's edict read:

Some have hesitated to follow yesterday's edict through a sense of modesty. This is most commendable. However, the situation is very critical, our lives depend upon the highest degree of efficiency we can attain, and a hot, miserable worker is not efficient. Your bodies are God's handwork—do not be ashamed of them.

The edict for the next day read simply, warningly:

THOU SHALT NOT COMMIT ADULTERY.

The Vogarian guards and inspectors, now in tropical uniforms, still looked out of place with their hol-

stered weapons but their former cold arrogance was gone and the attitude of the girls had changed from polite reserve to laughing, chattering friendliness.

He found Dalon in a far corner; cornered, literally, by the red-haired personnel supervisor who was spitting like a cat as she said:

"... Then tell your commander how one of your men tried to make one of my girls and got hit with a wrench for it! Ask him whether he wants us to produce fuel or make love! Go ahead—ask him! Or let me—I'll ask him!"

"You'll have to see to it that your girls don't lead my men on." Dalon ran his finger around his collar, worry on his face. "Florence, are you trying to get me ruined?"

"Then inform your men that there is a certain commandment we all believe in and anything beyond our willingness to be friends calls for marriage first."

"Marriage?" Dalon spluttered the word, recovered his poise with an effort, and said stiffly, "My men are soldiers, not suitors. I want them respected as such."

He strode away without seeing Kane. The girl stared after him, fuming, and Kane went in search of Graver.

Graver and the brown-eyed secretary were in Larue's office, their heads together over a flow sheet of some kind. The secretary excused herself and when she was gone, Kane asked:

"Where's Larue?"

"Checking the catalytic processors,

I think, sir." Graver answered, almost vaguely. "Mar . . . his secretary was just showing me how they improvised so much of their equipment so quickly." There was a strange light in Graver's usually expressionless eyes. "It's incredible!"

"Well—the commander gave them no time to waste, you know."

"Sir? Oh . . . I was referring to her intelligence, sir. It's amazing that a woman should have such a thorough knowledge of such a complex process."

Kane felt the birth pains of the first dark premonition.

"If you don't want a thorough knowledge of the interior of State prison," he said in grim warning, "you'd better get that silly look off your face and concentrate on your duties. Tell Dalon the same order applies to him. And tell Larue that the commander reminds him they now have less than forty hours to finish the job."

He decided, again, to walk back to the ship. There was now a multitude of paths through the grass where girls had been walking to and from work. Two groups from the last shift-change were a short distance ahead of him, several of Dalon's guards and Graver's technicians among them, all of them talking and laughing.

In that area they could not be spied upon by Y'Nor with the ship's view-screen scanners and even as he watched, a tall, dark young guard put his arm around the girl walking close beside him. She twisted away from

him and ran on to the next group, there to look back with a teasing toss of her head.

Kane watched both groups disappear over the hill, then followed, muttering thoughtfully. He felt he could safely assume—if anything could be said to be safe about the situation—that the lack of discipline he had just witnessed was typical of all the men. They were all young and healthy and for sixteen hours out of each day they were side by side with the almost nude, provocatively feminine, Sanctuary girls.

Their weakness was understandable. It was also very dangerous. Heads would roll if Y'Nor ever learned what was going on and it required no psychic ability to guess whose head would roll the fastest and farthest.

He would have to have it stopped, at once.

He took a short cut to Brenn's cottage, by a sleepy, shady street he had never been down before. Halfway along it was an open-air eating place of some kind, with tables placed about under the trees. There seemed to be no customers at the moment but he stopped, anyway, to take a closer look for errant guards.

A tawny head lifted at a table half hidden by a nearby tree and he looked into the surprised face of the mountain girl, Barbara.

"Well!" she said. "Come on over and let me offer you a glass of cyanide."

He walked over to her table. She was wearing a blouse and skirt simi-

lar to that of the day he had met her but the pistol was gone.

"I thought I told you to go back to your hills," he said.

"I decided it would be more fun to work in the plant and sabotage things."

"Let Y'Nor learn you said that and you'll be in a fix I can't help you out of."

"Should a Vogarian care?" But the the jeering was gone as she said, "When you gave my pistol back to me—I thought it was a trick of some kind."

"I told you I wasn't your enemy."

"I know . . . but it's hard for a Saint to believe any Vogarian could ever be anything else."

"It doesn't seem to be very hard for the girls in the plant," he observed glumly.

"Oh . . . that's different." She made a gesture of light dismissal. "Those soldiers and technicians are good boys at heart—they haven't been brain-washed like you officers."

"That's interesting to know, I'm sure. I suppose—"

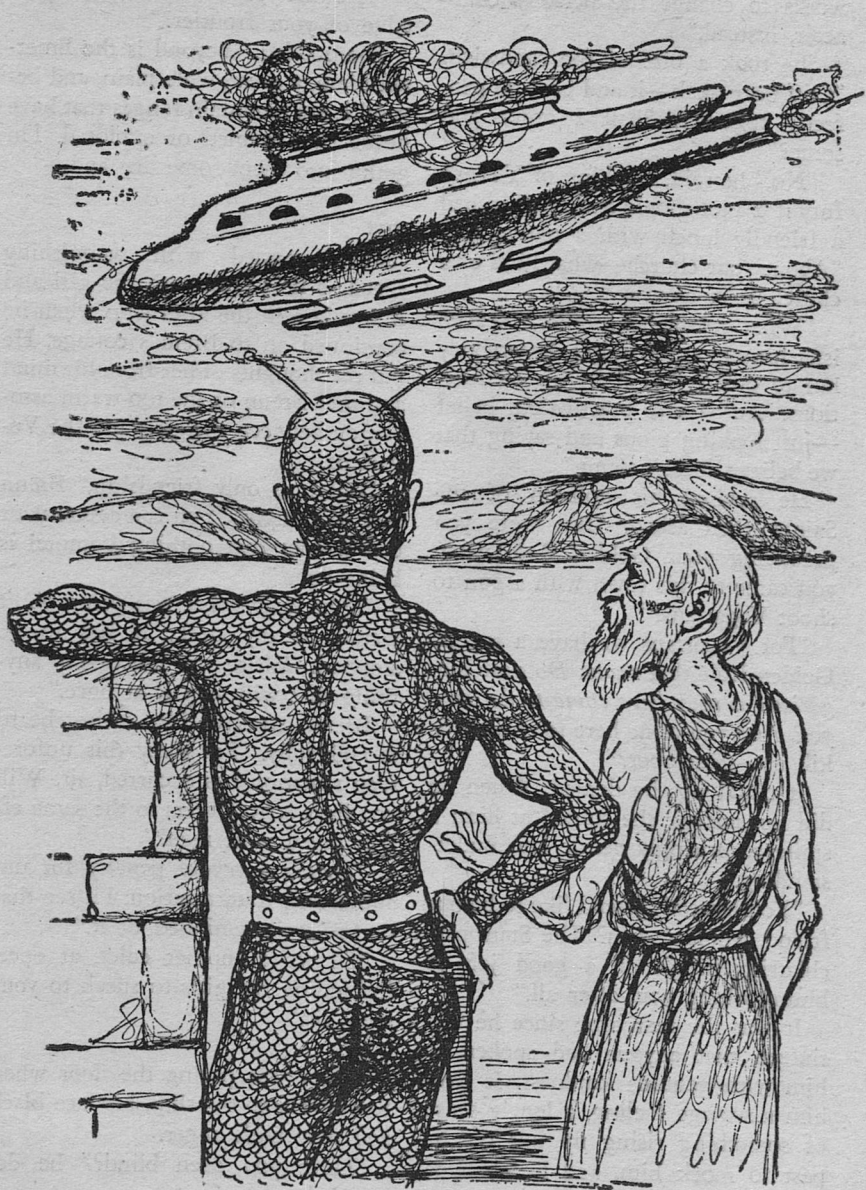
He stopped as a gray-haired woman came and set down a tray containing a sandwich and a mug. From the foamy top of the mug came the unmistakable aroma of beer.

"Do you Saints *drink?*" he asked incredulously.

"Sure. Why?"

"But your church—"

"Earth churches used to ban alcohol as sinful because it would cause a mean person to show his true character. My church is more sensible and



works to change the person's character, instead."

She took a bite of the sandwich. "Cliff bear steak—it and beer go perfectly together. Shall I order you some?"

"No," he said, thinking of Y'Nor's fury if Y'Nor should learn he had had a friendly lunch with a native girl. "About your church—what kind of a church is it, anyway?"

"What its name implies. Heaven isn't for sale at the pulpit—everybody has to qualify for it by his own actions. We have to practice our belief—just looking pious and saying that we believe doesn't count."

He revised his opinion of the Saints, then asked. "But were you practicing your Golden Rule when you came to this town with a gun to shoot Vogarians?"

"For Vogarians we have a special Golden Rule that reads: *Do unto Vogarians as they have come to do unto you*. And you came here to enslave or kill us—remember?"

It could not be denied. When he did not answer she smiled at him; a smile surprisingly gentle and understanding.

"You honestly would like to be our friend, wouldn't you? The State psychiatrists didn't do a good job of brainwashing you, after all."

It was the first time since he was sixteen that anyone had spoken to him with genuine kindness. It gave him a strange feeling, a lonely sense of something rising up out of the past to mock him, and he changed the subject:

"Are the Azure Mountains the edge of your frontier?"

She nodded. "Beyond is the Emerald Plain, a great, wide plain, and beyond it are mountain ranges that have never been named or explored. I'm going into them some day and—"

Time passed with astonishing speed as he talked with the girl and it was late in the afternoon when he continued on to Brenn's cottage. He put the thoughts of her from his mind and told Brenn of the too-warm association between the girls and the Vogarians.

"But it is only friendship," Brenn said soothingly. "You can assure your commander that nothing immoral is being done."

"If he knew what was going on, it would be my neck. It has to be stopped. Write an edict—do anything that will stop it at once."

Brenn stroked his white beard thoughtfully. "I'm sorry this unforeseen situation has occurred, sir. Will you have strict orders to the same effect given your men?"

"There's a severe penalty for unauthorized fraternization. I'll see that they're well reminded of it."

"I'll write another edict, at once, forbidding the girls to speak to your men, sir."

Y'Nor was pacing the floor when Kane went to the ship, his face black and ugly with anger.

"Have you been blind?" he demanded.

Kane tried to swallow a sinking feeling, wondering just how much Y'Nor had seen, and said, "Sir?"

"My guards—my so-called guards—how long have they been strolling back from the plant in company with the native women?"

"Oh," he said, feeling a great relief that Y'Nor had not seen the true situation, "it's only that some of the outgoing shifts coincide, sir, and—"

"You know, don't you, that military men march to and from duty in military formation?"

"Yes, sir."

"You are aware of the importance of discipline?"

"Yes, sir."

"You are further aware of the fact that you, Dalon, and Graver, will be guilty of treason if this lack of discipline imperils my plans in any way?"

"Yes, sir."

"You have heard of the punishment for treason?"

"Yes, sir."

He went below when the unpleasant business with Y'Nor was finally over. It was the beginning of the eight-hour sleep period for Dalon and Graver but they were still up, sitting on their bunks and staring dreamily into space. It was only belatedly, almost fuzzily, that they became aware of his glowering presence in the doorway.

"I bring you glad tidings," he said, "from the commander's own lips. The multiple-gallows at State prison is still in perfect working order, especially the first three trapdoors—"

The last day dawned, bright and sunny, and he went to see Brenn.

"I had the new edict posted immediately," Brenn said. "I hope it will undo the damage."

"Let's see it," Kane requested and Brenn handed him the handwritten original. It was:

Despite our affection for the Vogarians among us, we must not endanger them by any longer talking to them. A Vogarian military rule is now being enforced which forbids Vogarians to speak to Sanctuary girls except in the line of duty. There is a severe penalty for those who disobey this rule.

It must also be pointed out, sternly to the Sanctuary girls and respectfully to the Vogarians, that flight into the uninhabited Sanctuary mountains would result in execution for the fleeing couples if Commander Y'Nor should ever find them.

"What's this?" Kane demanded, pointing to the last paragraph.

"Why—a warning, sir."

"Warning . . . it's a suggestion!"

"A suggestion?" Brenn lifted his hands in shocked protest. "But, sir, how could anyone think—"

"I, personally, wouldn't give a damn if the entire crew was too love-sick to eat. But the commander does and my future welfare, including the privilege of breathing, depends upon my retaining what passes for his good will."

"Good heavens—I shall have this edict removed from the bulletin boards at once!"

"A great idea. It should fix up ev-

everything to lock the stable door now that the horse is stolen."

He went to the plant and felt the air of resentment as soon as he stepped inside. Dalon was patrolling among his men, his haggard face becoming more haggard each time the red-haired personnel supervisor went by with her hips swinging and her head held high in hurt, aloof silence. The guards were pacing their beats in wordless quiet, Graver's technicians were speaking only in the line of duty. The girls were not talking even to one another but in the soft, melting glances they gave the Vogarians they said *We understand* in a manner more eloquent than any words.

In fact, far too eloquent. He considered the plan of having Brenn forbid the girls to look at the guards, discarded that as impractical, for a

moment wildly considered ordering the guards not to look at the girls, discarded that as even more impractical, and went, muttering, to Larue's office.

Larue was at his desk, his face lined with fatigue.

"It's been a difficult job," he said, "but we'll meet the deadline."

"Good," Kane answered. "Did Brenn phone you about having that edict removed?"

"Ah—which one?"


"Which one? You mean . . ."

He turned and ran from the office.

A girl was removing the offending edict from the nearest bulletin board. Another, later, one proclaimed:

We must abandon as hopeless the suggestion of some that if there must be an Occupation force, we would like for it to be these men whom we have come to respect, and many of

« *Continued on page 170* »

Statement of the Ownership, Management, and Circulation required by the Act of Congress of August 24, 1912, as amended by the Acts of March 3, 1933, July 2, 1946, and June 11, 1960 (74 Stat. 208) of ANALOG Science Fact  fiction published monthly, at New York, N.Y., for October 1, 1961.

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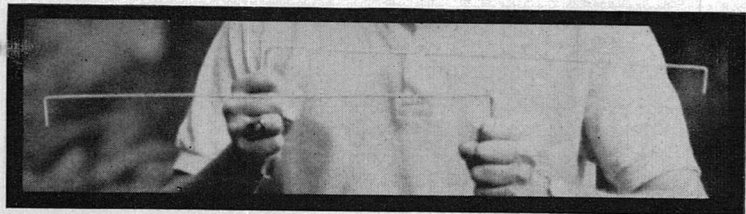
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THOMAS H. KAISER, Secretary of Street & Smith Publications, Inc.
Sworn to and subscribed before me this 20th day of September, 1961. Richard Burns, Notary Public No. 24-0509325, Kings County. (My commission expires March 30, 1963.)

Engineer's Art BY RANDALL GARRETT



To some people, a “fact” is something found in books; what happens in Nature is not a “fact,” but a “phenomenon,” and not really important. Herewith an account of what can best be described as “a well-documented run-around” when our reporter tried to get Yale University to discuss “a phenomenon”...



Harry C. Ritchie, of the Milford Water Works uses the dowsing rods for the usual reason an engineer uses a piece of equipment—because they work usefully, and save money and time in locating pipes.

■ The story may be apocryphal, but it has the ring of truth. It seems that a certain quaestor, some two thousand years back, was sent out from Rome on a routine job of checking the books of the various projects that were being financed by the City—the building of roads, aqueducts, and the like. He particularly wanted to look at the work of an aqueduct engineer, one Facio Facile—not because there was anything wrong with Facio's work, but, on the contrary, because there was so much right about it. Facio could build an aqueduct that was as good or better than those built by other engineers, and he managed to do it with less expenditure of money.

Upon reaching the spot where Facio was working, the quaestor was told that Facio himself might be

found atop the stonework, so the quaestor climbed up to see what the engineer was doing.

He came upon a strange sight. Facio, a big, burly man, built like a Thracian gladiator, was tossing chips of wood into the stream that ran along the top of the aqueduct and counting softly to himself.

He would drop in a piece of wood, and, as it was caught by the current, he would begin: "I, II, III, IV, V, VI, VII, . . ." Further downstream, an assistant eyed the water carefully, and, as the chip of wood passed a certain mark, he would call out, "*Desiste!*" "Stop!" Facio would mark down something on his tablet, toss in another chip, and begin counting again.

The quaestor hated to interrupt this interesting bit of magic—undoubtedly

ly a spell of some kind to keep the water going—so he waited quietly until Facio noticed him.

Finally, when he had finished with his mysterious ritual, Facio came over to where the quaestor was standing, whereupon, with some small ceremony, the quaestor identified himself and produced his papers of commission, or whatever passed for such papers in those days. Then he said: "I say, Facio, that was an interesting spell you were using. Appolonian, isn't it?"

"Eh?" said Facio, looking blank.

"Er . . . Pythagorean, I meant, of course," said the quaestor, correcting himself hastily. "The numbers—"

"Oh, *that*." Facio gestured deprecatingly. "No, noble quaestor, I was just checking to see how fast the water is flowing."

It was the quaestor's turn to look blank. "How *fast*? Why, whatever for?"

"Well," said Facio, "the faster the water is moving, the less pressure there is against the sides of the duct, so you don't have to build the walls so thick. Saves stone."

"There's *less* pressure, the *faster* it goes?" The quaestor was not sure he had heard aright.

"That's right," said Facio Facile.

Now, this did not seem right to the quaestor. *Vir et puer*, he had had some thirty years of experience with rivers. He had swum them, waded across them, rowed boats across them, drunk out of them, and even fought in them, and he *knew* that the pressure was

greater in a fast-running stream than it was in a slow-running one. In a lake, where there was no current at all, a man could walk in up to his neck, but some of those fast-moving Alpine streams would bowl a man over before the water got to his knees. He said as much to Facio.

"I know, I know," said the engineer without concern. "It may not sound right, but that's the way it works."

"But *why*?"

Facio Facile shrugged. "I don't know why, noble quaestor. And I don't much care. All I know is, it works; and as long as it works, I use it."

The problem bothered the quaestor all the way back to Rome. It *still* didn't sound right. And yet, there was no doubt that Facio's principle worked; he had figures to prove it. Not abstract, abstruse figures, either, but nice solid, concrete figures, expressed as sesterces and denarii. Financial figures that even a senator could understand. By saving stone at the right places, Facio Facile was also saving time and labor, which meant that he was saving money.

Not only that, but Facio's aqueducts didn't spring leaks that called for costly repairs—another money-saver.

After making his report to his superiors—who didn't care how Facio was saving money, either, so long as he did it—the quaestor went to see the famous mathematician and philosopher, Mens Clausa, to whom he outlined what he had seen and heard.

Mens Clausa listened with polite skepticism; he, too, had had experience with rivers.

"Well, now," said Mens Clausa, "it sounds like magic to me, and mathematics can't be applied to magic, you know. And I don't believe in magic, anyhow, much."

"I thought maybe it was based on some scientific principle," said the quaestor.

Mens Clausa shook his head. "We have done a lot of work on the principles discovered by the great Archimedes and I assure you that the laws of hydrostatics do not account for any such phenomenon as you describe. No, I'm afraid I can't help you. Better go see a sorcerer, noble quaestor."

The quaestor did just that, but the sorcerer didn't know anything about that kind of spell, and suggested that the quaestor ask a priest. After discussing it with three or four Vestal Virgins and two lesser *pontifices*, who in turn referred him to someone higher up in the hierarchy, the quaestor finally spoke to the *pontifex maximus* himself.

"No," said the P.M., "that's not in my field. Has nothing to do with religion. Sounds like a lot of foolishness to me."

So the quaestor went home, troubled at heart because the wisest men of Rome knew nothing of the problem and had no wish to investigate it, while Facio Facile went quietly on with his work of building aqueducts.

As I said, the story is undoubtedly apocryphal, but it has the ring of truth.

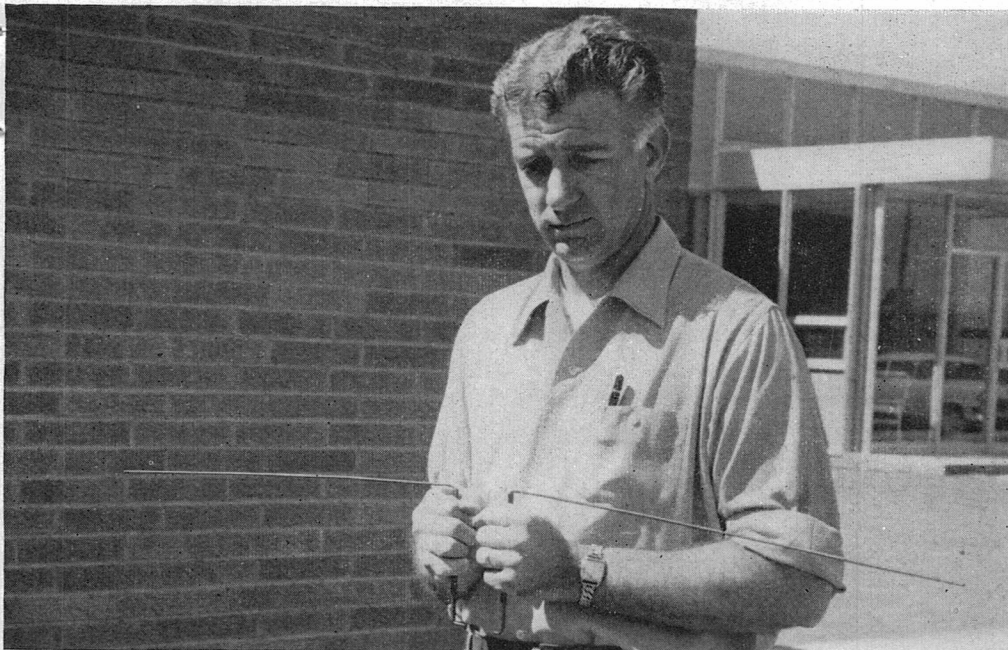
I know, because I, too, went on just such a quest this past August.

A couple of years ago, in the October, 1958 issue of this magazine, John Campbell printed an article in which he described a most unusual gadget for locating pipes. It consists of two sections, built alike, one section being held in each hand. Each section consists of a thin steel rod bent in an L, with the shorter leg of the L—about five inches long—inserted loosely into a copper tube, which serves as a handle and allows the longer leg—about eighteen inches long—to swing freely when the copper handle is gripped.

Using them is equally simple. Take one of the sections in each hand and march across an area where you suspect a pipe is buried, and hold them so that the long legs are pointed out straight in front of you, "like a Western sheriff holding a couple of six-guns," to borrow Mr. Campbell's phrase. As you approach the buried pipe, the legs will begin to swing, either outward or inward. When you are directly over the pipe, the legs will be in line with each other.

Because of the simplicity of the device, many readers built a pair for themselves and tried them out, and letters came in from all over, voicing various theories as to their operation. Mr. Jim Harmon, a writer who lives in the Midwest, even built a pair out of coat-hanger wire and a couple of Coke bottles and had a certain measure of success with them.

W. F. Marklund, Distribution Supervisor of the Division of Water Supply, for the city of Flint, Michigan, was one of the pioneers in introducing the rods to utilities engineers in this country.



But the question of how they worked remained unanswered.

It was pointed out that the things are so sensitive that a slight tilt of the handles, when they are held, will make the pointers swing in the direction of the tilt. That's all very well and good, but it merely brings up another question, to wit: How does the operator know when he is over the pipe? I won't go into the explanations that were offered for *that*, except to say that they ranged all the

way from "subconscious extrasensory perception" to "cheating."

In order to dig up more information, I took a train to the city of Milford, Connecticut,* armed with a camera, a battery-powered tape recorder, and a whole slew of questions.

Milford, Connecticut, is a town of fifty-thousand, more or less, an hour and a half from New York by train and some nine miles from New

* Not to be confused with Milford, Pennsylvania, home of the annual Science Fiction Writers' Conference.

Haven, Connecticut, the home of Yale University.

The day before, I had made an appointment with Mr. Harry C. Ritchie, manager of the Milford Water Works, so he was ready for me when I showed up at his office at half past nine in the morning.

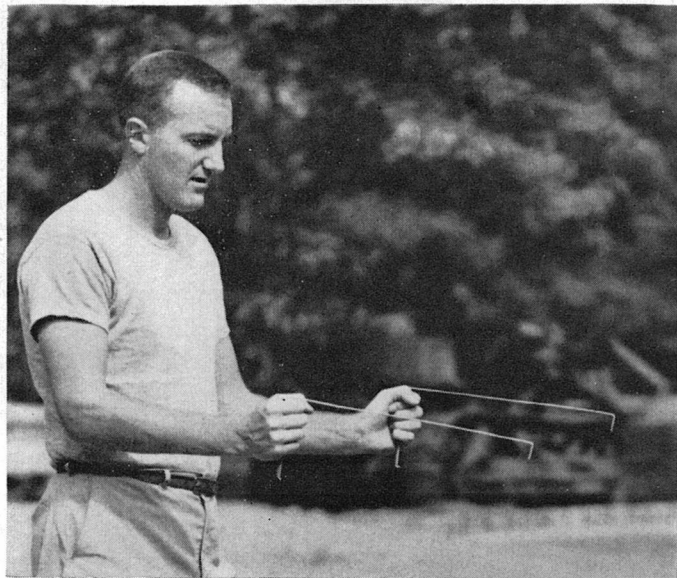
Harry Ritchie is a man in his early fifties, of medium height, with a

"Mr. Garrett wants us to show him how our pipe locators work," he explained. "Want to take a ride?"

"Sure," Herb Ahrens said.

Harry Ritchie opened a locker and got out the locators. They were a well-worn pair, looking as though they'd had as much use as any Western sheriff's forty-four had ever had. Then he put on his hat, and the three

*Construction workers
use the rods
before bulldozing
or running a
ditching machine
through—
they need to know
where pipes are
to avoid
tearing them out.*



shock of light-gray hair, a pleasant smile, a business like manner, and a soft voice that seems to have a touch of the South in it. He shook my hand warmly and led me through a busy outer office to his own office in the rear, where he introduced me to his assistant manager, Mr. Herbert Ahrens, a slim, quiet man in his thirties.

of us went out to Mr. Ritchie's car. He slid under the wheel, and Herb Ahrens sat next to him. I, burdened down with recorder and camera, got the back seat all to myself.

We headed down the main street of Milford, toward the edge of town.

"How long have you been the manager of the water company, Mr. Ritchie?" I asked.

"Twenty years," he said. "I've been with the company for thirty-two years."

"How long have you been using this type of pipe locator?"

"About fifteen years. Since right after the war. We've had very good results with them."

"Where do you get them?" I asked. "Do you buy them or make them?"

"We have them made. Years ago, we used to have a lot of difficulty locating pipes. I used to spend, sometimes, days, digging cross-ditches. The boys at New Haven had a set of these, and I borrowed them and tried them out, and they worked for me, so I had the New Haven Water Company build me a set of my own. I wouldn't be without them."

"Do they still use them in New Haven?"

"No," he said, "not any more. Mr. Carl Welton, head of the engineering department there, has had no luck with them. Some of his men could use them, but the rest didn't have any faith in them, and *he* didn't have any faith in them, so they gave them up as inaccurate."

I asked Herb Ahrens, who has been Ritchie's assistant for ten years, if he could use the locators.

"Yes," he said, "I've used them successfully many times."

We went over a bridge on the outskirts of Milford, and Harry Ritchie turned off the highway onto a road that was nothing more than a couple of worn tire ruts. It looked as though it might become a cow path a little farther on, then degenerate into a

squirrel track which would go up the side of a tree and disappear into a knothole. Still, for the first hundred feet or so, the tire-tracks looked well-used. I said as much to Harry Ritchie.

He grinned. "They're well used, all right. If it isn't the kids driving in here to neck, it's the State Police driving in to make sure they *don't* neck."

He stopped the car, and we climbed out.

Now, keep it in mind that this was a *demonstration*. It was *not* designed as an experiment. Neither Ritchie nor Ahrens—nor, for that matter, I—had the time to set up a rigidly scientific experiment that would exclude all possibilities of bias, error, foreknowledge, and the like. All I wanted was to see how they are used in the field, and that's what Mr. Ritchie was going to show me.

"There's a sixteen-inch main buried along in here somewhere," he said. "Let's see if we can find it." He picked up the two locators, aimed them, and started marching forward with slow, deliberate steps. "You've got to take it easy," he said, "otherwise you're liable to walk right over the pipe before they have a chance to swing."

The rods began to swing out. He took two more steps, and they were at right angles to their former position.

"You want to try it?" he asked, offering me the locators.

Me, I'm the reckless, foolhardy type. Throwing caution to the winds,

I got a firm grip on the two gizmos, backed off a little way, and started marching.

I decided not to aim for the same spot that Mr. Ritchie had aimed for; I aimed at a spot three or four yards to one side. I had no idea which way the pipe ran, except that it was at an angle to my line of march. If it were at right angles, that would have meant that Mr. Ritchie would be directly to my right when—and if!—the locators reacted. When I reached that point, nothing had happened.

"Keep going," said Mr. Ritchie.

I kept going.

Now, I'm willing to take an oath that I did nothing consciously to move those rods, but they began swinging outward at the next step, and, two steps farther on, they were parallel to my shoulders.

"Now let me show you something," said Mr. Ritchie.

He walked past me to some nearby bushes on my left, about four yards away, and pushed the foliage aside. "There's the service manhole," he said.

I was standing almost exactly on the center of a line drawn between the manhole and the spot where Ritchie had gotten his indication. As I said, this was a demonstration, not an experiment, but it was an impressive demonstration.

"Let's go up on the highway," said Mr. Ritchie. We left the car parked where it was, and walked back to the highway. This time Mr. Ahrens took the locators and walked across the pavement, as soon as there was a hole in the traffic. About three feet from

the far edge, the rods swung out again.

"That's the same sixteen-inch main," Ritchie explained. "I'll show you where it is a little farther up the road."

We walked up the highway to a crossroad, where Mr. Ritchie demonstrated the locators once more. I had noticed that the wind, which was rather gusty, had a tendency to wiggle the rods when I was using them, and had mentioned that fact to Herb Ahrens. As Ritchie approached the location of the pipe, Ahrens reached down, pulled up a few blades of grass, and let them fall in the wind just as the locators were swinging in his boss' hands. The wind was at Ritchie's back, and the rods were swinging *against* the wind!

Then Mr. Ritchie proceeded to show that it didn't take a hulking big sixteen-inch main to make those rods react. A six-inch pipe that led from the main to a fire hydrant several feet off the highway did the job as well.

"They'll pick up a one-inch service pipe to a house just as easily," Ritchie said.

We began walking back toward the car. "You say your men use these, too, Mr. Ritchie?" I said.

"That's right."

"All of them?"

"No. No; over the past fifteen years, I'd say about fifty per cent of the men can use them. But those fifty per cent can use them very accurately."

"A sort of all-or-none proposition?" I asked.

Ritchie nodded. "Either you can use them or you can't. They either work for you or they don't. If they don't work for you, they're useless; if they do, they're very accurate."

As we drove back to Milford, I asked Mr. Ahrens about his experiences with the locators.

"Well, I've seen them go wrong a few times," he told me, "but I'd say

"I think," he said, "that I'd have more faith in the electronic machine—that is, for accuracy within inches. But I've used these when the electronic machine has been out of commission, and I've picked up a main as deep as seven feet down with them. And within a foot or so of the actual location. When you go down seven feet, you have to be accurate."



Unlike electronic devices, the dowsing rods do not react to accidental buried scraps of metal—which makes them ideal for locating and avoiding buried pipes in a steel-mill yard construction project, or other metal-working shop yard.

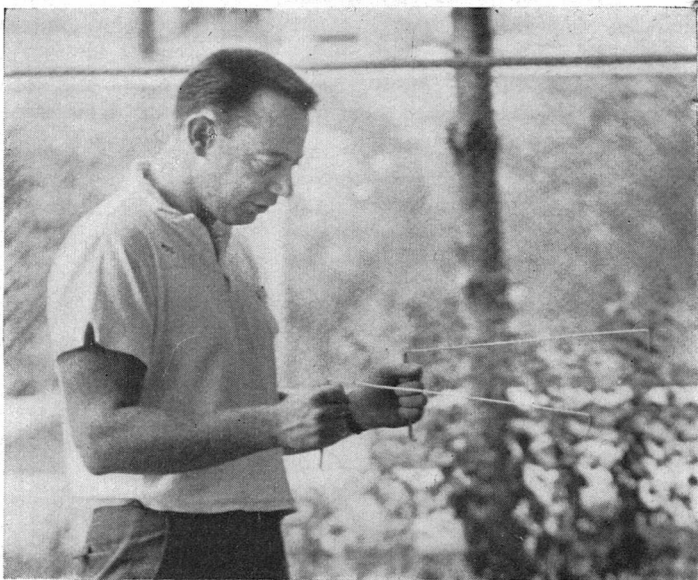
that, for me, they're most successful about ninety per cent of the time."

For ten years, the Milford Water Works used nothing but these locators. Then, about five years ago, they bought an electronic locator. I asked Mr. Ahrens how the L-shaped locators compared with the electronic locator, as to accuracy.

"The advantage to these things," Ritchie put in, "is that there's no expense to them at all. You can make a pair for two dollars and a half. The electronic machine costs two hundred and seventy-five dollars, and the accuracy is about the same, in my estimation.

"Don't get me wrong," he contin-

The suburbanite looking for the pipes feeding and draining the swimming pool can save a lot of lawn-damage.



ued, "the electronic pipe locator is a very good machine, and we put a lot of trust in it. We wouldn't be without it now."

"For a long-run layout," Ahrens said, "these things aren't too practical because it takes too long to center the pipe. You have to check it four or five times, back and forth across the street."

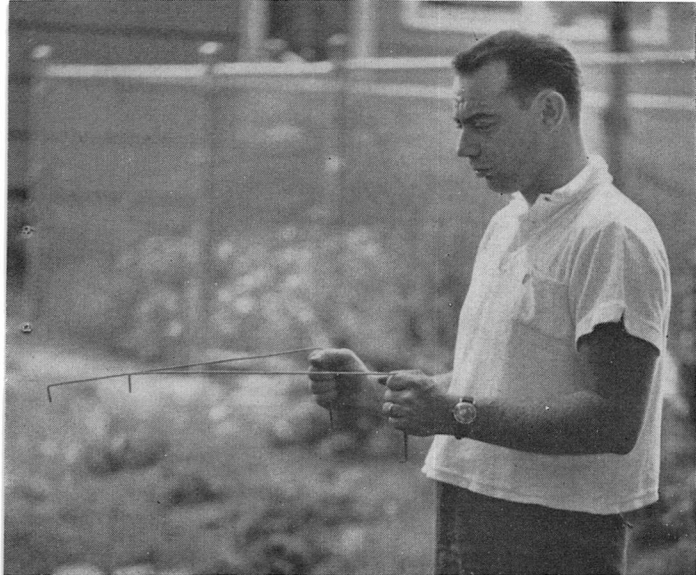
"That's right," Ritchie agreed. "With the electronic machine, you can follow the pipe directly. You can follow the main no matter how much it curves in the road, and you can mark out your trench as you go, so it's

more efficient. In that way, it is superior to these rods.

"But when the electronic machine is up for repairs," he said, "we still use these."

"For an outfit that doesn't have any means of locating a pipe," Ahrens said, "these are definitely a money saver and a time saver—not only to a utility company, but to a private digger who wants to be able to locate a pipe fairly accurately."

When we got back to Mr. Ritchie's office, I had a chance to go into further detail on the use and operation of the locator rods.



*And sometimes turns up a mystery.
A definite pipe reaction turned up . . .
but apparently it was an abandoned pipe line.
It didn't continue to any termination.*

"Do you have any idea how they work?" I asked.

"I haven't the least idea how they work," he said. "I think that it's magnetism, but that's all. I believe the rods are magnetized."

I thought that was odd, because, in handling the rods, I had noticed no tendency for them to attract or repel each other. "Do you mean they'll lift up a pin or a nail, the way a magnet does?" I asked.

"Oh, no; they're not magnetized in *that* sense of the word."

I could see what he meant. The rods *do* tend to behave as though there were some "magnetic" force making them line up with the pipe in the way that a compass needle lines up with the lines of force of Earth's

magnetic field—but, as Mr. Ritchie said, they're not magnetized in that sense of the word.

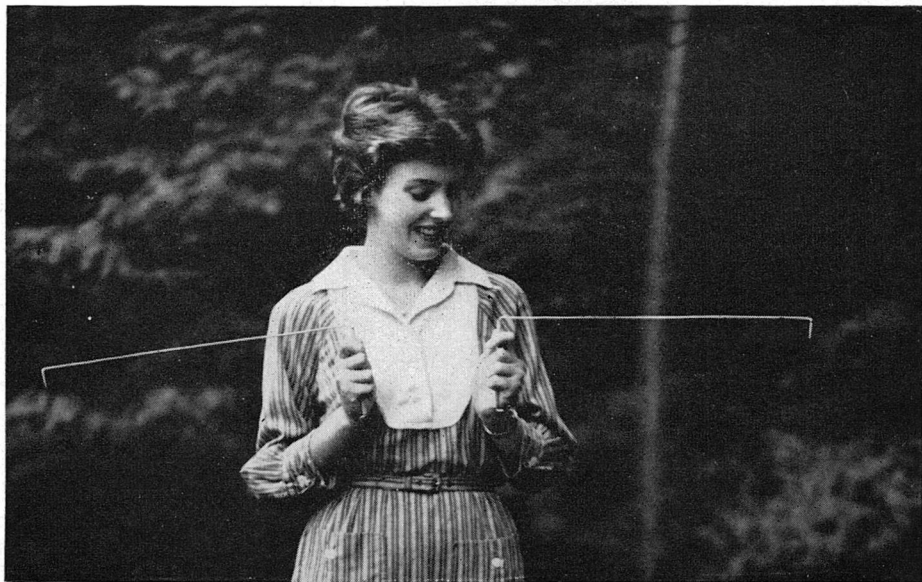
I asked him if he had ever done any experimenting with the locators—such as looking for a buried piece of wire or the like.

"I have, but I've had no luck with it. Too small, I think. That's where the electronic locator will throw you off. They're too sensitive. A lot of cinders have iron in them, and that doesn't attract the rods, whereas it *does* attract the electronic machine; the electronic machine will go wild. These won't. They won't work unless there's something definitely there."

"In other words," I said, "these only pick up what you're looking for, not the scrap and the junk."

"That's right. They won't pick up anything but pipe. Of course, you can pick up a cast-iron gas pipe as easily as you can a cast-iron water pipe. That's why I say it would be easier if you knew approximately the location of your water pipe. By 'approximate location,' I mean that you have to know there's a water pipe in the street

originally laid its location is marked out on maps, the distance being measured from nearby landmarks, such as a curb or a building. But buildings and curbs aren't permanent; they are torn down, and new structures are erected. Roads are straightened or widened or both. After a pipe has been underground a few years, the surface may



Almost anyone can use the rods successfully. A high school student . . .

—otherwise, you wouldn't be looking for it."

I asked Mr. Ahrens if he had ever done any experimenting with the locators.

"Every time you use it, it's an experiment," he said, "because every time you use it, there's a doubt."

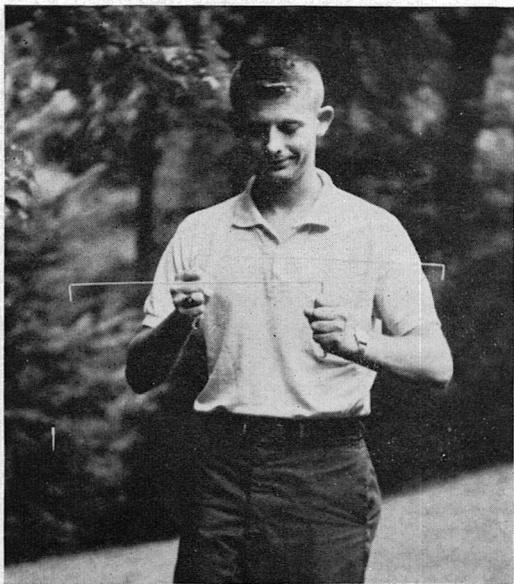
He explained that when a pipe is

be so changed that the reference marks are gone, and the map is useless.

"Under concrete or blacktop," he said, "if the road has been changed or resurfaced, you might think you know where the main is and be quite surprised when you go out there and find it's somewhere else.

"You can lay a pipe in a develop-

ment, say, today, and they can put in curbs tomorrow, and you've lost your markings from the day before. Pipe is supposed to be laid six feet from the edge, but if the surveyors change the line, or there's a difference of opinion about the line, the pipe could be under the sidewalk or in the middle of the road."



... College student (accountancy major) ...

"If you have to dig up a pipe running under a paved road," I said, "what kind of financial position are you in if you make a mistake?"

"Well," said Mr. Ritchie, "we have to dig till we find it, so we can't afford to make a mistake."

"Does it cost quite a bit of money to rip up a road?"

"Yes, it does. And we depend a great deal on these rods. If we dug into the wrong side of the road, that would be a lot of extra expense."

"Has that ever happened?" I asked.

"That has never happened," Ritchie said flatly. "We always come within two feet of the line."

Mr. Ritchie has never had any experience with nonmetallic pipes—Transite, clay, or concrete—since the Milford Water Works doesn't use any of those types. However, F. W. Marklund, of Flint, Michigan—another engineer who uses these locators—has success with nonmetallic pipes.

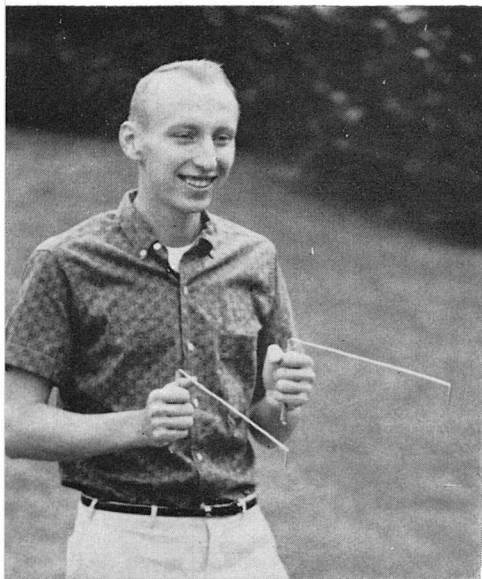
Herb Ahrens had already remarked that the locators only worked ninety per cent of the time for him, and he proceeded to amplify that statement: "I have found them, at times, undesirable when there is a lot of overhead electricity. But that is also true of the electronic machine; you'll have variations."

Both men agreed that the locators were not influenced one way or another by the dampness of the ground itself, nor by whether the pipe was full or empty.

By the time I left, I had, thanks to these two men, obtained a lot more firsthand information on the use of those locator rods than I had had when I started. But I wanted more. Surely a gadget like that, which has successfully been used commercially for fifteen years, would have attracted the attention of *somebody* who was both curious to find out how they worked and had enough scientific background to give them a good going-over.

The obvious place was Yale University, only a few miles away.

Sloane Physics Laboratory, where the administrative offices of the Physics Department are located, is a big, Gothic-looking building out on Prospect Street, about five blocks from the Old Campus. I found the office of the secretary of the department, and made inquiries.



Pipe locators? Why, yes, they had a man who had done some work along those lines. One phone call later, and I was walking across a short open space to Gibbs Laboratories, a severely modern building, gray and glassy, looking like the UN Building laid on one edge. I went up one flight, and went to the office of Professor Hugh Robinson, who had consented to

give me a little of his valuable time.

Professor Robinson is a tall, well-built man with a handsome face, short-cropped dark hair, and a quiet, studious manner. He looks as though he would be a good basketball player, and, for all I know, he might be.

He asked me to sit down, and listened attentively while I explained what kind of information I was after.

*... Or art school major.
(In this experiment,
incidentally, the operator
was checking the
observation that,
when you want to find
the water main,
the rods do not react
to the obviously
present sewer main.)*

I described the locators, told him how they were operated, what I had seen at Milford, and then popped my question: "Could you tell me how they work?"

He thought for a few seconds, then said, "Those would be the divining-type locators. There is supposedly no physical explanation for how they work, in the sense that physics, or sci-

ence, can tell you why they work. It's one of those weird things that people *claim* work, like telepathy or something like that."

"They're being used regularly down in Milford," I pointed out. "The manager of the Water Works there, Mr. Ritchie, has been using them successfully for fifteen years."

"It's possible to locate buried pipes electronically," Professor Robinson said, "but, if these are the ones I've read about, they're one of those so-called divining rods."

"Have you ever made any investigation of them?" I asked.

"No, I haven't. You can find these things written up in 'Fads and Fallacies in Science,' by Martin Gardner. He talks a good bit about this kind of thing. Some people use a forked twig.

"Now, if it were steel or cast-iron pipe, I can see how it might be picked up by a magnetized rod—if the pipe weren't too deep in the ground."

"Mr. Ritchie says his men have picked them up as deep as seven feet down," I told him.

He frowned a little. "I don't see how that could be done, even with a magnetized rod."

"You mean it would have to be buried shallowly, like the mines that were picked up by the mine detectors during the war?"

"Even that was an electronic detector," he said. "It sends out a signal, and you get a reflection of that signal by the conducting object. There is a type of detector for detecting non-

conducting materials, but it can only be done in homogeneous earth. The surroundings have to be homogeneous or it's liable to detect the nearest rock. But these types are not of this divining method, at all."

I said, "Do you know of anyone who is investigating this divining-type detector?"

"No one that I know of," he said. "Certainly nobody here is doing any work on them; we're more interested in basic research."

"Well," I said, "my point is that I've seen these things work, and I'd like to find someone who can tell me *how* they work."

"This looks like one of those weird things that you either believe or you don't believe," he said. "Gardner doesn't believe that they work."

"No. But Mr. Ritchie does. He's using them regularly."

"This technique," he said, "is probably something that we'd classify as nonscientific."

"You mean that it would be impossible to investigate it?" I asked.

"Well, we wouldn't investigate it here," he told me. "The people who would be interested in that would probably be the Psychology Department."

"The Psychology Department?"

"Yes. Once you determine that such things have a nonphysical basis of operation—if the operator is involved at all—then this would be up to the Psychology Department. If you couldn't use a mechanical man, if you couldn't use it on the Moon, say, with robots, if the operator is involved, the

Psychology Department would handle it. Duke University is doing a lot of this stuff. I don't know whether Dr. J. B. Rhine is working on this particular type of thing, but he's working on mental telepathy and such."

"It seems to me," I said, "that if this thing works on a commercial basis, if a man is actually saving money by using these locators, then it's worth investigation by *someone*."

"Well, two or three years ago, I saw a write-up of these. It was in one of these popular science magazines, or some such publication as that."

I had a strange feeling that I knew which magazine he was talking about, but I didn't interrupt him.

"According to the description, you can use coat-hanger wire or steel welding rods or brass welding rods or whatever you can get hold of, bend them like that, and put them in copper-tube holders. The author of the piece didn't make any claims; he just said, 'Try them out and see. They seem to work for us, maybe they'll work for you.'"

Did you ever try it?"

"No," he said, "I've never tried it."

"Do you know of anyone else in the department who might be interested in these things?" I asked.

"No. As I say, that would be for the Psychology Department." He paused, and then asked: "Did you look for things yourself with them?"

"Yes," I said, "they seem to work for me."

"Do you just pick them up and start using them?"

"Just pick them up and start walking across the ground," I said. "When you come to a pipe, they swing either in or out."

"I see." He looked thoughtful for a few seconds, then he said, "Well, the only type of detectors that we work with here are the electronic detectors, based on some basic, fundamental law of physics."

"If you haven't investigated these things," I said, "how do you know that their operation doesn't involve some basic, fundamental law of physics?"

"All the laws of physics that we have found so far," he said, "make a tremendous, complex structure based on a very few postulates. Any man, anywhere in the universe, we believe, can observe the same things we observe in our laboratories. He doesn't have to have a Coke bottle set on one edge of his desk and a drawer pulled open just so far, and things like that." He gestured, to indicate the Coke bottle on the edge of his own desk and the open drawer beneath it. "They are literally universal laws, and are completely independent of the operator."

"I had the impression," I said, "that Heisenberg's Uncertainty Principle says, in effect, that the operator is *necessarily* involved in an experiment."

"Well, the operator disturbs the system," he admitted. "But, statistically, we should all observe the same thing. It doesn't mean that you'll get different laws."

"These forces, the way things re-

act, and the way particles move—as far as we know, in all our experience, in everything we know about them—are independent of the operator. Except that he, himself, may have a magnetic field, or something like that.”

“Well,” I said, “if no one has investigated this at all, how do you know it is linked to the operator?”

“These things are supposedly well understood; these are not the areas in question at all now. If there is a pipe in the ground, one understands the fields and forces exerted on another piece of matter nearby. Given the two types of matter, one can predict this. And one knows how much force it takes to cause the deflection of such a device as you described, taking into account the friction of bearings and so forth.

“Then you simply examine the known forces in the thing, and determine whether they are enough to do the job. If there isn’t, you would probably conclude either that the thing doesn’t work, or that there is some mysterious effect caused by the operator, who tilts them in such a way that they swing out.

“The operator apparently knows, subconsciously, that the pipes are there, and swings them in some way or other. That’s the explanation that is often given.”

“Would you say, then, that it isn’t in the realm of physics to investigate this device, even if it does work?”

“Believe me,” he said, “I’d like to see one and see it used. To check it, you’d have to dig holes and bury things, and dig other holes and *not*

bury things, and make some sort of systematic check on it, which could certainly be done.

“But this type of problem is something that, usually, we’re not interested in as a matter of research.”

“And you have no idea who would be, except for the Psychology Department?”

“No. The reason I say the Psychology Department is that this appears to be something involving the operator. That would be my very strong guess, and it would have to be *proved* that it was *not* something involving the operator, first of all, before we could work on it.

“Certainly, if the thing works, it would be very nice to explain *why* it works—but I’m not convinced it works.”

“I remember an engineer,” I said, “who was convinced all through 1945 and through most of ’46 that the atomic bomb was pure propaganda, because ‘everybody knows you can’t influence the rate of atomic disintegration.’”

“Well, he just didn’t know enough,” said Professor Robinson.

“Yeah,” I said. “Exactly. It seems to me that there are some areas that *nobody* knows enough about.”

“Hm-m,” he said noncommittally.

We discussed electronic detectors for a few minutes more, then I thanked him for his time and information and asked him if he could recommend any particular person in the Psychology Department. He suggested that my best bet was to get in touch with the secretary. I thanked

him again and headed for the Psychology Department.

I don't know whether the Trustees of Yale had any conscious thought of intentional symbolism when they separated the buildings housing the Students of Matter from those housing the Students of the Mind, but it is a geographical fact that the Physics Department is situated near one extreme of the long Yale campus, while the Medical Center, where the Psychology Department is located, is eleven blocks away, at the other end. Only the Divinity School, just beyond the Physics Department, is farther away from the Psychology Department. I wasn't driving, and small town taxis have meters on them that turn very rapidly. Like South American politics, they require a tachometer to measure the RPM.

After a little telephoning, the girl at the information desk informed me that Dr. Claude Buxton, head of the department, was unavailable but that Dr. Allan R. Wagner would see me.

Dr. Wagner is fairly tall and lean and has his blond hair crew cut. He was wearing dark-rimmed glasses, Bermuda shorts, and an easy smile.

After I told him what I wanted, he made it clear that he did not want to be quoted on anything he said. In deference to his wishes, all I will give is the general impression I received.

There seems to be a generalized feeling in psychological circles that such things as these pipe locators are subconsciously manipulated by the

operator. The operator knows the terrain, and subconsciously responds to cues given to him by geographical configurations, the actions of other persons nearby who know the location of the buried pipe, and so on. Belief—faith, if you will—in the operation of the locators enables these subconscious impressions to come to the fore enough to cause a slight tipping out of the hands when the hints indicate he is over the right place.

Thus, they are similar in operation to the pendulum sex-detector, which consists of a small weight—an ounce or so—attached to the end of a five- or six-inch length of thread. The unattached end of the thread is held between thumb and forefinger, allowing the weight to swing freely. When this device is held over the hand or head of another person, the weight will swing back and forth in a straight line if the person is male, and will swing around in a circle if the person is female. It is also used to detect the sex of the author of a letter or the owner of a piece of clothing. Many psychologists believe that this, too, is the result of hints that register only on the subconscious—a whiff of perfume or pipe tobacco, say, would do the trick, even if the person holding the pendulum were blindfolded.

Many other psychologists won't even go that far. They tend to discount or minimize even the effect of such subconscious hints and point out that poor records are kept of the actual number of successes and failures; that, statistically, good records would

show that the number of successes are no greater than chance would allow, but, the human mind being what it is, the number of successes are exaggerated in importance, and the number of failures forgotten.

Dr. Wagner, like Professor Robinson, referred me to Martin Gardner's "Fads and Fallacies in Science."* (I had read the book, both in the original and in the revised edition.)

I got the impression that Dr. Wagner was of the school of thought that believes properly kept records would show that the detectors' success-to-failure ratio is no better than chance permits.

I asked Dr. Wagner if there was anyone else in the department who might be working on this or any related problem. So far as he knew, there was not. He even very kindly went to the trouble of asking several of his colleagues whether they knew of any such studies. None did.

The only work of that kind, apparently, was that being done at Duke by Dr. J. B. Rhine.

Dr. Wagner suggested that someone at the Physics Department might be able to tell me more about the physical forces involved than he could. I thanked him very much for

*It's remarkable that both the Physics and Psychology departments at Yale cited this frankly heavily biased, and inaccurate book—done by a non-Ph.D. at that!—as an authority on the subject. In most areas, professional scientists do not consider the meticulous *Encyclopedia Britannica* at all adequate as a reference, and certainly would not cite a nonscientist, Martin Gardner, in preference to widely-recognized professional scientists such as J. B. Rhine, Ph.D. and Professor H. J. Eysenck. The standards of what constitutes an "adequate authority" with respect to psi phenomena show an amazing shift from the standards applied in other areas. Ed.

his information and time, and went back out to the sweltering streets of New Haven.

The ghost of that ancient Roman quaestor rose up beside me and suggested that I try the Divinity School next. I bade him begone, to return whence he came, and headed back to New York.

What had I learned? Well, in terms of direct information received, not much. I still did not and do not know what makes those locators work.

Magnetism? No. A field strong enough to cause those rods to move that way would be easily detectable. If the rods themselves were that magnetic, the tips would either repel or attract each other with a force that would be immediately apparent. If the pipes underground were that magnetic, there would be no need for locators of any kind; all you'd have to do would be to follow the line of beer cans, bottle caps, hairpins, paper clips, and other ferrous rubbish that would accumulate on the ground above them.

I had, of course, heard the "subconscious reaction to nearly imperceptible hints" theory before. I was well aware that many people dismiss the whole thing by saying that records, if kept, would show that there were far more failures than successes. I also know that even when records are kept and carefully tabulated, as they are in Dr. Rhine's experiments, many people will still dismiss the tabulations as erroneous or biased.

I am not going to quarrel with any of the theories that have been cooked up to explain or explain away the operation of those detector rods. Nor will I advance any theory of my own.

Why? Because, as far as I have been able to discover, *not a single one of those theories has ever been subjected to any kind of experimental checking!*

This is what they call science?
Heavens to Betsy!

Now please notice that I am not taking either Professor Robinson or Dr. Wagner to task for not personally having done any work in that field. As Dr. Isaac Asimov pointed out in his article, "The Sound of Panting," no scientist today can be expected to have read all the literature in his field, much less to have actually conducted laboratory experiments on every path and byway that comes along. But that's not the point.

The point is that both Robinson and Wagner—aye, and even Martin Gardner—have repeated theories that *no one* has bothered to check! I'm not trying to single these men out as the sole offenders; not by a long shot. Far from standing alone, they are apparently standing with the great majority of their colleagues.

Have there been no records kept? Well, I should say that the financial record of the Milford Water Works is a pretty good indication of the success-to-failure ratio. Look at it: Mr. Ritchie, for ten years, used these detectors exclusively, and he says that not once has he ever been more than two feet from the pipe he's been look-

ing for. Could he have "forgotten" his mistakes? Brother, you just don't dig up the wrong side of a road, making a mistake that may cost thousands of dollars, and then forget about it! Not if you're the kind of guy who can manage a business successfully for twenty years by depending on *not* making mistakes like that.

What about that "subconscious reaction to imperceptible hints" theory? Has it been checked? Has anybody tried to see if the human mind *is* capable of doing any such thing? Somebody should! The mechanism would be useful if it could be controlled. If police could be trained in its use, Sherlock Holmes would be outclassed by every good detective who had been trained in the art.

(As an aside, I might mention that I visited the Police Department while I was in Milford, and I had the pleasure of meeting Sergeant Angelo Marino, a big man in his middle thirties who is almost the perfect stereotype of the tough, burly, efficient, but very kind-hearted cop. We got to talking about police work, and I said that it was odd how frequently a police officer, with no apparent evidence, will investigate something or someone on a "hunch" and have his hunch verified.

"If a man *doesn't* get hunches like that," said Sergeant Marino, "he's not going to be a very good cop."

Is there any relationship between that ability and the ability to use the pipe locators? I wonder.)

Or do the locators operate on some definite, but heretofore unknown

physical principle? Is it possible that, just as the science of hydrostatics cannot predict the effects of *moving* water, modern field theory is not inclusive enough to encompass this particular effect? I don't know, but certainly someone should find out. The phenomenon is there, and any science which is trying to explain the workings of the physical universe should certainly include *all* observable phenomena, not dismiss some as "non-scientific."

Or, last and a hell of a long way from least, do the locators operate on some psionic principle? Is there some kind of extrasensory perception involved, by which the operator perceives the pipe subconsciously and that information is transmitted to the nerves and muscles controlling the rods?

I am and always have been irritated by the complacent feeling, manifested by so many people, that "we know how things work now because we have all the answers." Damn it, ignorance may bring some kind of bliss, but it is a dangerous kind of catalepsy to sink into, and it is *not* folly to be wise. No matter how beautifully a set of postulates fits together to form a structure that explains a given set of phenomena, one single phenomenon which can *not* be explained should call for a re-examination of the postulates, not the development of a

blind spot, so that the intruding discrepancy can be politely ignored.

Fortunately, there are, and there always have been, men who will look and observe and theorize and check their theories, without saying, "That is impossible according to what I know, therefore it doesn't exist." Nor, do these men point a finger and say, "That's *his* department, not mine." Especially when they do not know what department the phenomenon is included in!

Nor are these men saying, "Gee whiz, I'd like to experiment with those things, but if I do everybody will think I'm a nut."

A scientist worthy of the name—and there are a few—does not think anybody is a nut just because he investigates a phenomenon. Those who do are not worthy of respect and it is no loss to the investigator if they *do* think he is a nut.

I, personally, am doing some work on these particular gizmos. If and when I come up with anything new, I'll let you know. But bear in mind that I am, primarily, a writer, not a scientist. These days, it takes, at the very least, a Ph.D. to swing very much weight in scientific circles. I am simply not qualified to do scholarly research.

Meanwhile, Mr. Harry C. Ritchie and Mr. Herbert Ahrens are going quietly about their business of running a water company, and they are doing very well at it, indeed. ■

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MULTIPLE CHOICE QUESTION:

It takes . . . for light from the nearest known star to reach Earth. 1: Five years. 2: Two months. 3: Eight minutes. 4: Three seconds. Answers on page 169

NEPTUNE ORBIT OBSERVATORY

■ All modern astronomy rests on an inadequate, and rather shaky foundation—the Earth. The fact that astrophysics and astronomy are, necessarily, observational sciences—until, at least, we are able to put together stars and planets ourselves—makes the observational equipment the very essence of the science.

Necessarily, to date, astronomy must use the Earth and its movements as the basis from which all of its work extends. The distance to the Moon is measured by triangulation, using the surveyed diameter of the Earth as a base line. For a 230,000 mile distance, an 8,000 mile base line is reasonably satisfactory. (Ideal would, of course, be a base line about the same order of length as the distance to be measured.) But for measuring the 93,000,000-odd miles to the Sun, or even the 23,000,000-odd to Venus, it's an inadequate base line.

The base line for measuring the distance to the nearest stars is even

less adequate—the 186,000,000 mile diameter of Earth's orbit. First, of course, we don't know that base line accurately, because we have to measure it by using our 8,000-mile Earth base line. Second, even if we knew it accurately, the distances to be measured are light-years, and our base line is in light-minutes. Almost exactly 1,000 light-seconds, which isn't a very adequate base for measuring even the nearest stars.

Space satellites—manned space satellites—will allow us to use enormously better instruments, without the problems of atmospheric interference. But that won't give us an adequate base line for measurements . . . unless the space satellites are at enormously greater distances, and positioned with precisely known accuracy.

Neptune is 2,800,000,000 miles from the Sun; it has an orbit that is very nearly perfectly circular, and with very low inclination to the plane of the ecliptic. (Unlike Pluto, which has a highly eccentric, and highly inclined orbit.) In the year 2011, Neptune will have completed one

complete orbit under astronomical observation. The accuracy with which its orbit is known far exceeds anything that could be arranged for an independently orbiting space satellite; Neptune's orbit has been surveyed with meticulous accuracy for more than a century.

Further, the orbit of any space satellite would be unstable; as supplies are brought to it, and men and materials taken away, the mass of the satellite would be continually undergoing small, but significant changes.

Neptune's immense mass wouldn't be subject to such variations. But, unfortunately, Neptune is anything but an hospitable environment; if domes could be built and maintained there, we'd have our instruments sunk in a turbulent atmosphere again anyway.

Space observatories in orbit about Neptune, however, would be tied to Neptune's precisely known positions by simple, highly accurate survey. Neptune's 3,000-mile diameter moon, Triton, moreover, could serve as a location for a fixed base-camp serving the space observatories. It's not going to be desirable to have heavy machine tools mounted in the observatory stations; they vibrate things. Since Triton, too, has been observed over many decades, Triton's orbit also is known with high precision, and the angular relationship Sun-Neptune-Triton can be calculated at any time, with accuracy greater than it could be measured, because many decades of precision observation have smoothed out instrumental errors.

Neptune is almost thirty times as far from the Sun as Earth; not only is the Sun's light and heat decreased by the inverse square law to about 1/900th of what it is at Earth—so are the intensities of solar radio emission, magnetic fields, and particle radiation—the Sun's own super-van-Allen belt system.

The Crab Nebula has been identified as the remains of a supernova that exploded about 1050 A.D.—and also as one of the most intense radio-emission sources in the galaxy. And there is indication that it's also a source of extremely high-energy cosmic rays. Calculations of the white dwarf stellar remains from the supernova blast indicate it has a diameter of about 17,000 miles, and is *still* radiating—despite that minute size!—*at a rate 30,000 times our Sun's!* Surface temperature has been estimated at 500,000°—at which temperature, naturally, almost no light—relatively speaking—is emitted. The star is radiating nearly all of its output in the most extreme ultraviolet and X-ray regions.

Neither of those radiations can pass through an atmosphere; we badly need X ray, cosmic ray, and ultraviolet telescopes, as well as radio telescopes to cover the spectrum we're now missing, or barely detecting.

The Neptune Orbit Observatory would be far better than Earth-satellite observatories not only because of escaping the Sun's flood of similar radiation—but because Earth itself would be a shrieking, howling bedlam of radio transmissions.

Mount Wilson Observatory has had steadily increasing difficulty as Pasadena increased in size, and Pasadena's use of electric lighting increased per capita. Any Earth-satellite observatory could expect a similar problem.

The use of the diameter of Neptune's orbit for triangulating stellar distances would be ideal—within the Solar System, at least, it's the best possible—except for one slight difficulty. It takes too long—one hundred sixty-five years—to get from one end of the orbit to the other.

However, using plates made at Neptune, and plates made at an asteroid observatory, or at a Jupiter satellite observatory, we would have the necessary two-position readings of angles, and would have a base line some 3,000,000,000 miles long.

Incidentally, the materials used in building the space-observatory instruments involve certain problems we've never before had to consider.

The difficulties experienced in our space probes have shown us that, in space, you can't just use any handy metal! Where Earth's atmosphere makes the ultra-light metals lithium and sodium unusable due to chemical attack—in space, the lack of atmosphere makes them unusable due to their vapor pressure! They simply sublime away into space.

Even more common metals such as aluminum, copper, zinc, and lead are unusable—they give off a continuous, contaminating cloud of vapor that will condense on anything in the vicinity. The usable metals are the ones you'll find in regular use in high-vacuum devices that are designed to maintain a vacuum, while running hot—nickel, tantalum, tungsten, zirconium, and the quasi-metallic graphite, all of which are used in high-power radio transmitter tubes where both temperature and high vacuum conditions are imposed. ■

In
times
to
come

Next month our cover will be done by a new artist, Lloyd Birmingham, who's done a nice job of presenting a familiar scene . . . under unfamiliar circumstances. Some one of these days, the polar glaciers are going to melt, you know . . . and that white stuff on Greenland alone is up to a mile thick.

H. Beam Piper has the feature novelette, "Naudsonse," which is a nonsense word referring to what nonsense words seem to be . . . when your method of listening to words happens to be a bit different.

The Editor


The Foreign Hand Tie

*Just because you can
"see" something
doesn't mean you understand it—
and that can mean that even
perfect telepathy
isn't perfect communication...*

BY DAVID GORDON

ILLUSTRATED BY BARBERIS

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From Istanbul, in Turkish Thrace, to Moscow, U.S.S.R., is only a couple of hours outing for a round trip in a fast jet plane—a shade less than eleven hundred miles in a beeline.

Unfortunately, Mr. Raphael Poe had no way of chartering a bee.

The United States Navy cruiser *Woonsocket*, having made its placid way across the Mediterranean, up the Aegean Sea, and through the Dardanelles to the Bosphorous, stopped overnight at Istanbul and then turned around and went back. On the way in, it had stopped at Gibraltar, Barcelona, Marseilles, Genoa, Naples, and Athens—the main friendly ports on the northern side of the Mediterranean. On the way back, it performed the same ritual on the African side of the sea. Its most famous passengers were the American Secretary of State, two senators, and three representatives.

Its most important passenger was Mr. Raphael Poe.

During the voyage in, Mr. Raphael Poe remained locked in a stateroom, all by himself, twiddling his thumbs restlessly and playing endless games of solitaire, making bets with himself on how long it would be before the ship hit the next big wave and wondering how long it would take a man to go nuts in isolation. On the voyage back, he was not aboard the *Woonsocket* at all, and no one missed him because only the captain and two other Navy men had known he was aboard, and they knew that he had been dropped overboard at Istanbul.

The sleek, tapered cylindroid might easily have been mistaken for a Naval torpedo, since it was roughly the same size and shape. Actually, it was a sort of hybrid, combining the torpedo and the two-man submarine that the Japanese had used in World War II, plus refinements contributed by such apparently diverse arts as skin-diving, cybernetics, and nucleonics.

Inside this one-man underwater vessel, Raphael Poe lay prone, guiding the little atomic-powered submarine across the Black Sea, past Odessa, and up the Dnieper. The first leg, the four hundred miles from the Bosphorous to the mouth of the river, was relatively easy. The two hundred and sixty miles from there the Dnepropetrovsk was a little more difficult, but not terribly so. It became increasingly more difficult as the Dnieper narrowed and became more shallow.

On to Kiev. His course changed at Dnepropetrovsk, from northeast to northwest, for the next two hundred fifty miles. At Kiev, the river changed course again, heading north. Three hundred and fifty miles farther on, at Smolensk, he was heading almost due east.

It had not been an easy trip. At night, he had surfaced to get his bearings and to recharge the air tanks. Several times, he had had to take to the land, using the caterpillar treads on the little machine, because of obstacles in the river.

At the end of the ninth day, he was still one hundred eighty miles

from Moscow, but, at that point, he got out of the submarine and prepared himself for the trip overland. When he was ready, he pressed a special button on the control panel of the expensive little craft. Immediately, the special robot brain took over. It had recorded the trip upstream; by applying that information in reverse—a "mirror image," so to speak—it began guiding itself back toward Istanbul, applying the necessary corrective factors that made the difference between an upstream and a downstream trip. If it had made a mistake or had been discovered, it would have blown itself to bits. As a tribute to modern robotics and ultraminiaturization, it is a fact that the little craft was picked up five days later a few miles from Istanbul by the U.S.S. *Paducab*.

By that time, a certain Vladimir Turenski, a shambling, not-too-bright deaf mute, had made his fully documented appearance in Moscow.

Spies, like fairies and other such elusive sprites, traditionally come in rings. The reason for this circumstructural metaphor is obscure, but it remains a fact that a single spy, all by himself, is usually of very little use to anybody. Espionage, on any useful scale, requires organization.

There is, as there should be, a reason for this. The purpose of espionage is to gather information—preferably, *useful* information—against the wishes of, and in spite of the efforts of, a group—usually referred

to as "the enemy"—which is endeavoring to prevent that information from getting into other hands than their own. Such activities obviously imply communication. An espioneur, working for Side A, who finds a bit of important information about Side B must obviously communicate that bit of information to Side A or it is of no use whatsoever.

All of these factors pose complex problems.

To begin with, the espioneur must get himself into a position in which he can get hold of the information he wants. Usually, that means that he must pass himself off as something he is not, a process which requires time. Then, when he gets the information he is after, he must get it to his employers quickly. Information, like fish, becomes useless after a certain amount of time, and, unlike fish, there is no known way of refrigerating it to retard spoilage.

It is difficult to transmit information these days. It is actually easier for the espioneur to transmit it than to get it, generally speaking, but it is difficult for him to do both jobs at once, so the spy ring's two major parts consist of the ones who get the information from the enemy and the ones who transmit it back to their employers.

Without magic, it is difficult for a single spy to be of any benefit. And "magic," in this case, can be defined as some method by which information can be either obtained or transmitted without fear of discovery by the enemy. During World War I, a

competent spy equipped with a compact transistorized short-wave communications system could have had himself a ball. If the system had included a miniature full-color television camera, he could have gone hog wild. In those days, such equipment would have been magic.

All this is not *à propos* of nothing. Mr. Raphael Poe was, in his own way, a magician.

It is not to be supposed that the United States of America had no spy rings in the Union of Soviet Socialist Republics at that time. There were plenty of them. Raphael Poe could have, if it were so ordained, availed himself of the services of any one or all of them. He did not do so for two reasons. In the first place, the more people who are in on a secret, the more who can give it away. In other words, a ring, like a chain, is only as strong as its weakest section. In the second place, Raphael Poe didn't need any assistance in the first place.

That is, he needed no more assistance than most magicians do—a shill in the audience. In this particular case, the shill was his brother, Leonard Poe.

Operation Mapcase was as ultra-secret as it could possibly be. Although there were perhaps two dozen men who knew of the existence of the operation by its code name, such as the Naval officers who had helped get Raphael Poe to his destination, there were only five men

who really knew what Operation Mapcase was all about.

Two of these were, of course, Raphael and Leonard Poe. Two others were the President of the United States and the Secretary of Defense. The fifth was Colonel Julius T. Spaulding, of United States Army Intelligence.

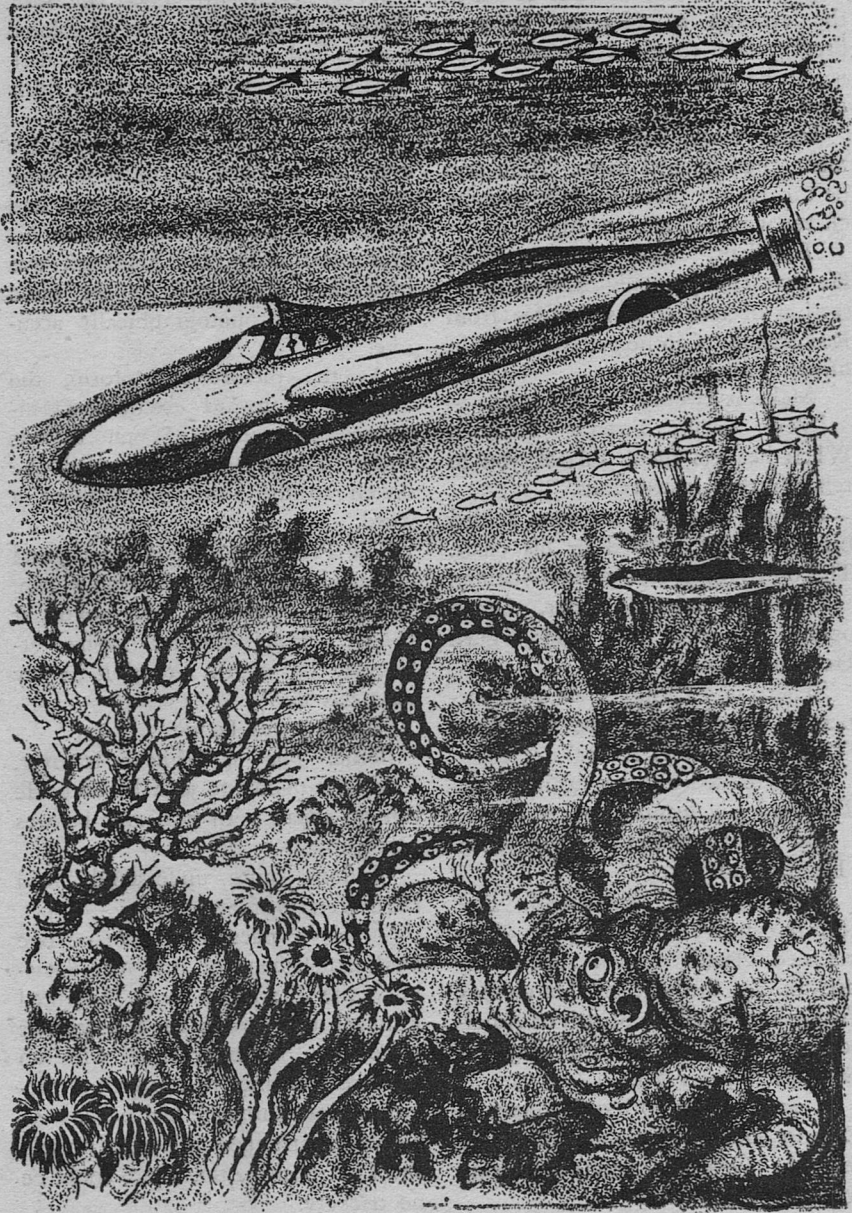
On the seventh day after Raphael Poe's arrival in Moscow, the other four men met in Blair House, across the street from the White House, in a room especially prepared for the purpose. No one but the President knew the exact purpose of the meeting, although they had an idea that he wanted more information of some kind.

The President himself was the last to arrive. Leaving two Secret Service men standing outside the room, he carefully closed the door and turned to face the Secretary of Defense, Colonel Spaulding, and Leonard Poe. "Sit down, gentlemen," he said, seating himself as he spoke.

"Gentlemen, before we go any further, I must conduct one final experiment in order to justify Operation Mapcase. I will not explain it just yet." He looked at Lenny Poe, a small, dark-haired man with a largish nose. "Mr. Poe, can you contact your brother at this moment?"

Lenny Poe was a man who was not overawed by anyone, and had no inclination to be formal, not even toward the President. "Yeah, sure," he said matter-of-factly.

The President glanced at his watch. "It is now five minutes of ten.



That makes it five minutes of six in the evening in Moscow. Is your brother free to move around? That is, can he go to a certain place in the city?"

Lenny closed his eyes for a moment, then opened them. "Rafe says he can go any place that the average citizen would be allowed to go."

"Excellent," said the President. He gave Lenny an address—an intersection of two streets not far from Red Square. "Can he get there within fifteen minutes?"

"Make it twenty," said Lenny.

"Very well. Twenty minutes. When he gets there, I'll ask you to relay further instructions."

Lenny Poe closed his eyes, folded his arms, and relaxed in his chair. The other three men waited silently.

Nineteen minutes later, Lenny opened his eyes and said: "O.K. He's there. Now what?"

"There is a lamppost on that corner, I believe," said the President. "Can your brother see it?"

Lenny closed his eyes again. "Sure. There's a guy leaning against it."

The President's eyes brightened. "Describe him!"

Lenny, eyes still closed, said: "Five feet ten, heavy set, gray hair, dark-rimmed glasses, brown suit, flashy necktie. By the cut of his clothes, I'd say he was either British or American, probably American. Fifty-five or fifty-six years old."

It was obvious to the Secretary of Defense and to Colonel Spaulding that the President was suppressing some inward excitement.

"Very good, Mr. Poe!" he said. "Now, you will find a box of colored pencils and a sketch pad in that desk over there. Can you draw me a fairly accurate sketch of that man?"

"Yeah, sure." Lenny opened his eyes, moved over to the desk, took out the pencils and sketch pad, and went to work. He had to close his eyes occasionally, but his work was incredibly rapid and, at the same time, almost photographically accurate.

As the picture took form, the President's inward excitement increased perceptibly. When it was finally finished, Lenny handed the sketch to the President without a word.

The President took it eagerly and his face broke out in his famous grin. "Excellent! Perfect!" He looked at Lenny. "Your brother hasn't attracted the man's attention in any way, has he?"

"Nope," said Lenny.

"Fine. The experiment is over. Relay my thanks to your brother. He can go ahead with whatever he was doing now."

"I don't quite understand," said the Secretary of State.

"I felt it necessary to make one final experiment of my own devising," the President said. "I wanted Raphael Poe to go to a particular place at a particular time, with no advance warning, to transmit a picture of something he had never seen before. I arranged this test myself, and I am positive that there could be no trickery."

"Never seen before?" the Secretary repeated bewilderedly. He gestured at the sketch. "Why, that's obviously Bill Donovan, of the Moscow delegation. Poe could have seen a photograph of him somewhere before."

"Even so," the President pointed out, "there would be no way of knowing that he would be at that spot. But that's beside the point. Look at that necktie!"

"I had noticed it," the Defense Secretary admitted.

It was certainly an outstanding piece of neckwear. As drawn by Leonard Poe, it was a piece of brilliant chartreuse silk, fully three and a half inches wide at its broadest. Against that background, rose-pink nude girls were cavorting with pale mauve satyrs.

"That tie," said the President, "was sent to me fifteen years ago by one of my constituents, when I was in Congress. I never wore it, of course, but it would have been criminal to have thrown away such a magnificently obscene example of bad taste as that.

"I sent it to Donovan in a sealed diplomatic pouch by special courier, with instructions to wear it at this time. He, of course, has no idea why he is standing there. He is merely obeying orders.

"Gentlemen, this is completely convincing to me. Absolutely no one but myself knew what I had in mind. It would have required telepathy even to cheat.

"Thank you very much, Mr. Poe.

Colonel Spaulding, you may proceed with Operation Mapcase as planned."

Dr. Malekrinova, will you initial these requisition forms, please."

Dr. Sonya Malekrinova, a dowdy-looking, middle-aged woman with unplucked eyebrows and a mole on her chin, adjusted her steel-rimmed glasses, took the proffered papers from the clerk, ran her eyes over them, and then put her initials on the bottom of each page.

"Thank you, Comrade Doctor," said the clerk when she handed back the sheaf of papers.

"Certainly, Comrade."

And the two of them went about their business.

Not far away, in the Cathedral of St. Basil, Vladimir Turenski, alias Raphael Poe, was also apparently going about his business. The cathedral had not seen nor heard the Liturgy of the Russian Orthodox Church, or any other church, for a good many decades. The Bolsheviks, in their zeal to protect the citizens of the Soviet Union from the pernicious influence of religion, had converted it into a museum as soon as possible.

It was the function of *Tovarishch* Turenski to push a broom around the floors of the museum, and this he did with great determination and efficiency. He also cleaned windows and polished metalwork when the occasion demanded. He was only one of a large crew of similarly employed men, but he was a favorite with the Head Custodian, who not only felt

sorry for the simple-minded deaf-mute, but appreciated the hard work he did. If, on occasion, Comrade Turenski would lean on his boom and fall into a short reverie, it was excusable because he still managed to get all his work done.

Behind Comrade Turenski, a guide was explaining a display to a group of tourists, but Turenski ignored the distraction and kept his mind focused on the thoughts of Dr. Sonya Malekrinova.

After nearly ten months of patient work, Raphael Poe had hit upon something that was, to his way of thinking, more important than all the information he had transmitted to Washington thus far.

Picking brains telepathically was not, even for him, an easy job. He had the knack and the training, but, in addition, there was the necessity of establishing a rapport with the other mind. Since he was a physicist and not a politician, it was much easier to get information from the mind of Sonya Malekrinova than to get it from the Premier. The only person with whom he could keep in contact over any great distance was his brother, and that only because the two of them had grown up together.

He could pick up the strongest thoughts of any nearby person very easily. He did not need to hear the actual words, for instance, of a nearby conversation in order to follow it perfectly, because the words of verbal communication were strong in a person's mind.

But getting deeper than that re-

quired an increasing amount of understanding of the functioning of the other person's mind.

His ability to eavesdrop on conversations had been of immense benefit to Washington so far, but it was difficult for him to get close enough to the higher-ups in the Soviet government to get all the data that the President of the United States wanted.

But now that he had established a firm mental linkage with one of the greatest physicists in the Soviet Union, he could begin to send information that would be of tremendous value to the United States.

He brushed up a pile of trash, pushed it into a dust pan, and carried it off toward the disposal chute that led to the trash cans. In the room where the brooms were kept, he paused and closed his eyes.

Lenny! Are you picking this up?

Sure, Rafe. I'm ready with the drawing board anytime you are.

As Dr. Sonya Malekrinova stood in her laboratory looking over the apparatus she was perfecting for the glory of the Soviet State, she had no notion that someone halfway around the world was also looking at it over her shoulder—or rather, through her own eyes.

Lenny started with the fives first, and worked his way up to the larger denominations.

"Five, ten, fifteen, twenty, twenty-five, thirty—forty, fifty, sixty . . ." he muttered happily to himself. "Two

fifty, three, three-fifty, four, four-fifty."

It was all there, so he smiled benevolently at the man in the pay window. "Thank you muchly." Then he stepped aside to let another lucky man cash a winning ticket.

His horse had come in at fifteen, six-ten, four-fifty for Straight, Place, and Show, and sixty bucks on the nose had paid off very nicely.

Lenny Poe took out his copy of the *Daily Racing Form* and checked over the listing for the next race.

Hm-m-m, ha. Purse, \$7500. Four-year-olds and up: handicap. Seven furlongs. Turf course. Hm-m-m, ha.

Lenny Poe had a passion for throwing his money away on any unpredictable event that would offer him odds. He had, deep down, an artistic soul, but he didn't let that interfere with his desire to lay a bet at the drop of an old fedora.

He had already decided, several hours before, that Ducksoup, in the next race, would win handily and would pay off at something like twenty or twenty-five to one. But he felt it his duty to look one last time at the previous performance record, just to be absolutely positive.

Satisfied, he folded the *Racing Form*, shoved it back into his pocket, and walked over to the fifty-dollar window.

"Gimmie nine tickets on Ducksoup in the seventh," he said, plonking the handful of bills down on the counter.

But before the man behind the window grating could take the money, a huge, hamlike, and rather hairy

hand came down on top of his own hand, covering it and the money at the same time.

"Hold it, Lenny," said a voice at the same time.

Lenny jerked his head around to his right and looked up to see a largish man who had "cop" written all over him. Another such individual crowded past Lenny on his left to flash a badge on the man in the betting window, so that he would know that this wasn't a holdup.

"Hey!" said Lenny. His mind was thinking fast. He decided to play his favorite role, that of the indignant Italian. "Whatsa da matta with you, hah? Thisa no a free country? A man gotta no rights?"

"Come on, Mr. Poe," the big man said quietly, "this is important."

"Poe? You outta you mind? Thatsa name of a river—or a raven. I'm a forgetta which. My namesa Manelli!"

"*Scusi, signore,*" the big man said with exaggerated politeness, "*ma se lei è veramente italiano, non è l'uomo che cerchiamo.*"

Lenny's Italian was limited to a handful of words. He knew he was trapped, but he faced the situation with aplomb. "Thatsa lie! I was inna Chicago that night!"

"*Ab! Cosè credevo. Avanti, saccen-tone.*" He jerked his thumb toward the gate. "Let's go."

Lenny muttered something that the big man didn't quite catch.

"What'd you say?"

"Upper United States—the northern United States," Lenny said calm-

ly, shoving his four hundred fifty dollars into his pocket. "That's where Chicago is. Never mind. Come in, boys; back to the drawing board."

The two men escorted Lenny to a big, powerful Lincoln; he climbed into the back seat with the big one while the other one got behind the wheel.

As soon as they had left the race-track and were well out on the highway, the driver said: "You want to call in, Mario? This traffic is pretty heavy."

The big man beside Lenny leaned forward, over the back of the front seat, unhooked the receiver of the scrambler-equipped radiophone, and sat back down. He thumbed a button on the side of the handset and said: "This is Seven Oh Two." After a short silence, he said: "You can call off the net. You want him brought in?" He listened for a moment. "O.K. Are we cleared through the main gate? O.K. Off."

He leaned forward to replace the receiver, speaking to the driver as he did so. "Straight to the Air Force base. They've got a jet waiting there for him."

He settled back comfortably and looked at Lenny. "You could at least tell people where you're going."

"Very well," said Lenny. He folded his arms, closed his eyes, and relaxed. "Right now, I'm going off to dreamland."

He waited a short while to see if the other would say anything. He didn't, so Lenny proceeded to do exactly what he had promised to do.

He went off to dreamland.

He had not been absolutely sure, when he made the promise, that he would actually do just that, but the odds were in favor of it. It was now one o'clock in the morning in Moscow, and Lenny's brother, Raphael, was a man of regular habits.

Lenny reached out. When he made contact, all he got was a jumble of hash. It was as though someone had made a movie by cutting bits and snippets from a hundred different films, no bit more than six or seven frames long, with a sound track that might or might not match, and projected the result through a drifting fog, using an ever-changing lens that rippled like the surface of a wind-ruffled pool. Sometimes one figure would come into sharp focus for a fraction of a second, sometimes in color, sometimes not.

Sometimes Lenny was merely observing the show, sometimes he was *in it*.

Rafe! Hey, Rafe! Wake up!

The jumble of hash began to stabilize, become more coherent—

Lenny sat behind the fat desk, watching his brother come up the primrose path in a unicycle. He pulled it to a halt in front of the desk, opened the pilot's canopy, threw out a rope ladder, and climbed down. His gait was a little awkward, in spite of the sponge-rubber floor, because of the huge flowered carpetbag he was carrying. A battered top hat sat precariously on his blond, curly hair.

"Lenny! Boy, am I glad to see you! I've got it! The whole trouble is in the wonkler, where the spadulator comes across the trellis grid!" He lifted the carpetbag and sat it down on the lab table. "Connect up the groffle meter! We'll show those pentagon pickles who has the push-and-go here!"

"Rafe," Lenny said gently, "wake up. You're dreaming. You're asleep. I want to talk to you."

"I know." He grinned widely. "And you don't want any back talk from me! Yok-yok-yok! Just wait'll I show you!"

In his hands, he held an object which Lenny did not at first understand. Then Rafe's mind brought it into focus.

"This"—Rafe held it up—"is a rocket motor!"

"Rafe, wake up!" Lenny said.

The surroundings stabilized a little more.

"I will in just a minute, Lenny." Rafe was apologetic. "But let me show you this." It did bear some resemblance to a rocket motor. It was about as long as a man's forearm and consisted of a bulbous chamber at one end, which narrowed down into a throat and then widened into a hornlike exhaust nozzle. The chamber was black; the rest was shiny chrome.

Rafe grasped it by the throat with one hand. The other, he clasped firmly around the combustion chamber. "Watch! Now watch!"

He gave the bulbous, rubbery chamber a hard squeeze—

"SQUAWK!" went the horn.

"Rafe!" Lenny shouted. "Wake up! WAKE UP!"

Rafe blinked as the situation clarified. "What? Just A Second. Lenny. Just . . ."

... A second."

Raphael Poe blinked his eyes open. The moon was shining through the dirty windows of the dingy little room that was all he could call home—for a while, at least. Outside the window were the gray streets of Moscow.

His brother's thoughts resounded in his fully awake brain. *Rafe! You awake?*

Sure. Sure. What is it?

The conversation that followed was not in words or pictures, but a weird combination of both, plus a strong admixture of linking concepts that were neither.

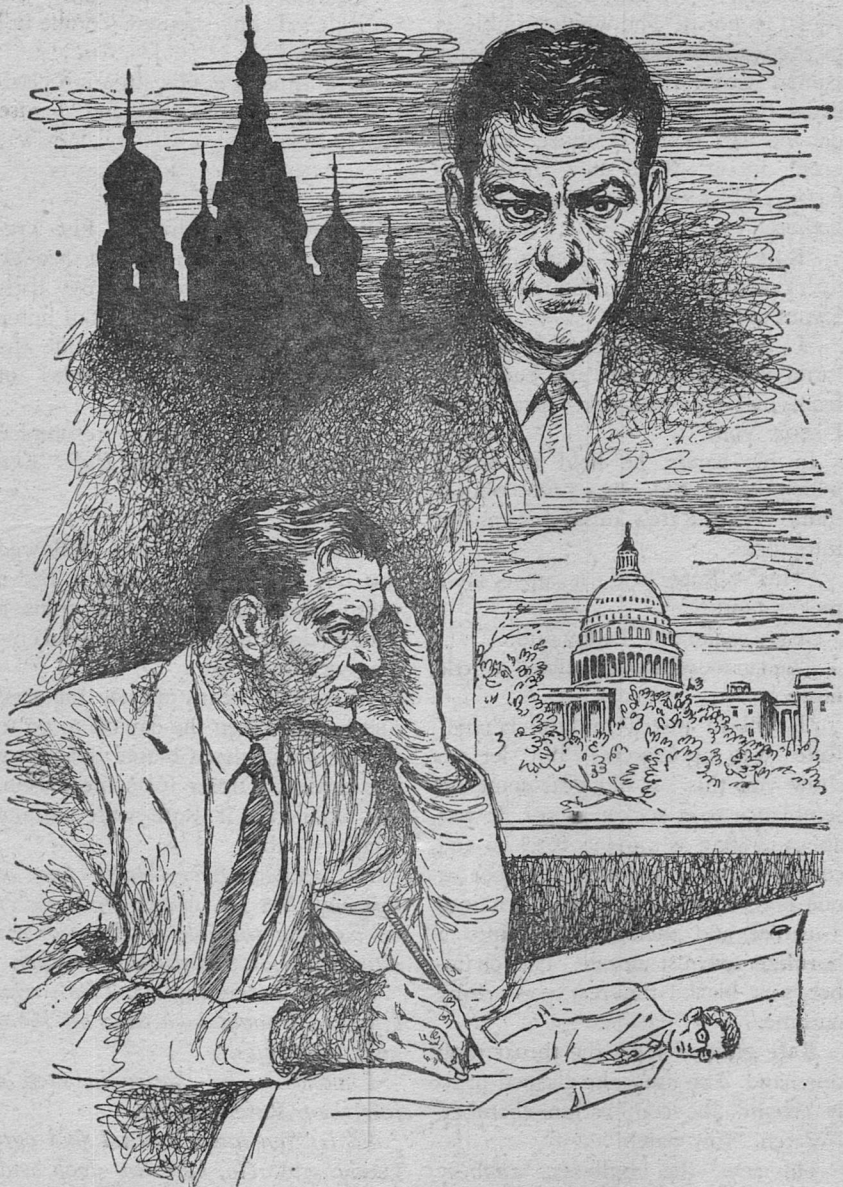
In essence, Lenny merely reported that he had taken the day off to go to the races and that Colonel Spaulding was evidently upset for some reason. He wondered if Rafe were in any kind of trouble.

No trouble. Everything's fine at this end. But Dr. Malekrinova won't be back on the job until tomorrow afternoon—or, this afternoon, rather.

I know, Lenny replied. That's why I figured I could take time off for a go at the ponies.

I wonder why they're in such a fuss, then? Rafe thought.

I'll let you know when I find out, Lenny said. *Go back to sleep and don't worry.*



In a small office in the Pentagon, Colonel Julius T. Spaulding cradled the telephone on his desk and looked at the Secretary of Defense. "That was the airfield. Poe will be here shortly. We'll get to the bottom of this pretty quickly."

"I hope so, Julius," the Secretary said heavily. "The President is beginning to think we're both nuts."

The colonel, a lean, nervous man with dark, bushy eyebrows and a mustache to match, rolled his eyes up toward the ceiling. "I'm beginning to agree with him."

The Defense Secretary scowled at him. "What do you mean?"

"Anybody who takes telepathy seriously is considered a nut," said the colonel.

"True," said the Secretary, "but that doesn't mean we *are* nuts."

"Oh, yeah?" The colonel took the cigar out of his mouth and gestured with it. "Anybody who'd do something that convinces all his friends he's nuts must be nuts!"

The Secretary smiled wanly. "I wish you wouldn't be so logical. You almost convince me."

"Don't worry," said the colonel. "I'm not ready to have this room measured for sponge-rubber wallpaper just yet. Operation Mapcase has helped a lot in the past few months, and it will help even more."

"All you have to do is get the bugs out of it," said the Secretary.

"If we did that," Colonel Spaulding said flatly, "the whole operation would fold from lack of personnel."

"Just carry on the best you can,"

the Secretary said gloomily as he got up to leave. "I'll let you handle it."

"Fine. I'll call you later."

Twenty minutes after the Defense Secretary had gone, Lenny Poe was shown into Colonel Spaulding's office. The agent who had brought him in closed the door gently, leaving him alone with the colonel.

"I told you I'd be back this evening. What were you in such a hurry about?"

"You're supposed to stay in touch," Colonel Spaulding pointed out. "I don't mind your penchant for ponies particularly, but I'd like to know where to find you if I need you."

"I wouldn't mind in the least, colonel. I'd phone you every fifteen minutes if that's what you wanted. Except for one thing."

"What's that?"

Lenny jerked a thumb over his shoulder. "Your linguistically talented flatfeet. Did you ever try to get into a floating crap game when you were being followed by a couple of bruisers who look more like cops than cops do?"

"Look, Poe; I can find you plenty of action right here in Washington, if it won't offend your tender sensibilities to shoot crap with a senator or two. Meanwhile, sit down and listen. This is important."

Lenny sat down reluctantly. "O.K. What is it?"

"Dr. Davenport and his crew are unhappy about that last batch of drawings you and I gave 'em."

"What's the matter? Don't they like the color scheme? I never thought scientists had any artistic taste, anyway."

"It's got nothing to do with that. The—"

The phone rang. Colonel Spaulding scooped it up and identified himself. Then: "What? Yeah. All right, send him in."

He hung up and looked back at Lenny. "Davenport. We can get his story firsthand. Just sit there and look important."

Lenny nodded. He knew that Dr. Amadeus Davenport was aware that the source of those drawings was Soviet Russia, but he did not know how they had been obtained. As far as he knew, it was just plain, ordinary spy work.

He came in briskly. He was a tall, intelligent-looking man with a rather craggy face and thoughtful brown eyes. He put a large brief case on the floor, and, after the preliminaries were over, he came right to the point.

"Colonel Spaulding, I spoke to the Secretary of Defense, and he agreed that perhaps this situation might be cleared up if I talked directly with you."

"I hope so," the colonel said. "Just what is it that seems to be bothering you?"

"These drawings," Davenport said, "don't make any sense. The device they're supposed to represent couldn't do anything. Look; I'll show you."

He took from his brief case photostatic copies of some of the drawings Lenny had made. Five of them were

straight blueprint-type drawings; the sixth was a copy of Lenny's near-photographic paintings of the device itself.

"This component, here," he said, gesturing at the set of drawings "simply baffles us. We're of the opinion that your agents are known to the Soviet government and have been handed a set of phony plans."

"What's it supposed to do?" Lenny asked.

"We don't know what it's *supposed* to do," the scientist said, "but it's doubtful that it would *actually* do anything." He selected one of the photocopies. "See that thing? The one shaped like the letter Q with an offset tail? According to the specifications, it is supposed to be painted emerald green, but there's no indication of what it is."

Lenny Poe reached out, picked up the photocopy and looked at it. It was—or had been—an exact copy of the drawing that was used by Dr. Sonya Malekrinova. But, whereas the original drawing had been labeled entirely in Cyrillic characters, these labels were now in English.

The drawings made no sense to Lenny at all. They hadn't when he'd made them. His brother was a scientist, but Lenny understood none of it.

"Who translated the Russian into English?" he asked.

"A Mr. Berensky. He's one of our best experts on the subject. I assure you the translations are accurate, Dr. Davenport said.

"But if you don't know what that

thing is," the colonel objected, "how can you say the device won't work? Maybe it would if that Q-shaped thing was—"

"I know what you mean," Davenport interrupted. "But that's not the only part of the machine that doesn't make any sense."

He went on to explain other discrepancies he had detected in the drawings, but none of it penetrated to Lenny, although Colonel Spaulding seemed to be able to follow the physicist's conversation fairly readily.

"Well, what's your suggestion, doctor?" the colonel asked at last.

"If your agents could get further data," the physicist said carefully, "it might be of some use. At the same time, I'd check up on the possibility that your agents are known to the NKVD."

"I'll see what can be done," said the colonel. "Would you mind leaving those copies of the drawings with me for a while?"

"Go right ahead," Davenport said. "One other thing. If we assume this device is genuine, then it must serve some purpose. It might help if we knew what the device is supposed to do."

"I'll see what can be done," Colonel Spaulding repeated.

When Davenport had gone, Spaulding looked at Poe. "Got any explanation for that one?"

"No," Lenny admitted. "All I can do is check with Rafe. He won't be awake for a few hours yet. I'll check on it and give you an answer in the morning."

Early next morning, Colonel Spaulding walked through his outer office. He stopped at the desk where the pretty brunette WAC sergeant was typing industriously, leaned across the desk, and gave her his best leer. "How about a date tonight, music lover?" he asked. "*Das Rheingold*' is playing tonight. A night at the opera would do you good."

"I'm sorry, sir," she said primly, "you know enlisted women aren't allowed to date officers."

"Make out an application for OCS. I'll sign it."

She smiled at him. "But then I wouldn't have any excuse for turning you down. And then what would my husband say?"

"I'll bribe him. I'll send *him* to OCS."

"He's not eligible. Officers are automatically disqualified."

Colonel Spaulding sighed. "A guy can't win against competition like that. Anything new this morning?"

"Mr. Poe is waiting in your office. Other than that, there's just the routine things."

He went on into his office. Lenny Poe was seated behind the colonel's desk, leaning back in the swivel chair, his feet on the top of the desk. He was sound asleep.

The colonel walked over to the desk, took his cigar from his mouth, and said: "Good mornrrning, Colonel Spaulding!"

Lenny snapped awake. "I'm not Colonel Spaulding," he said.

"Then why are you sitting in Colonel Spaulding's chair?"

"I figured if I was asleep nobody'd know the difference." Lenny got up and walked over to one of the other chairs. "These don't lean back comfortably. I can't sleep in 'em."

"You can sleep later. How was your session with Rafe?"

Lenny glowered glumly. "I wish you and Rafe hadn't talked me into this job. It's a strain on the brain. I don't know how he expects anyone to understand all that garbage."

"All what garbage?"

Lenny waved a hand aimlessly. "All this scientific guff. I'm an artist, not a scientist. If Rafe can get me a clear picture of something, I can copy it, but when he tries to explain something scientific, he might as well be thinking in Russian or Old Upper Middle High Martian or something."

"I know," said Colonel Spaulding, looking almost as glum as Lenny. "Did you get anything at all that would help Dr. Davenport figure out what those drawings mean?"

"Rafe says that the translations are all wrong," Lenny said, "but I can't get a clear picture of just what *is* wrong."

Colonel Spaulding thought for a while in silence. Telepathy—at least in so far as the Poe brothers practiced it—certainly had its limitations. Lenny couldn't communicate mentally with anyone except his brother Rafe. Rafe could pick up the thoughts of almost anyone if he happened to be close by, but couldn't communicate over a long distance with anyone but Lenny.

The main trouble lay in the fact that it was apparently impossible to transmit a concept directly from Brain A to Brain B unless the basic building blocks of the concept were already present in Brain B. Raphael Poe, for instance, had spent a long time studying Russian, reading Dostoevski, Tolstoy, and Turgenev in the original tongue, familiarizing himself with modern Russian thought through the courtesy of *Izvestia*, *Pravda*, and *Krokodil*, and, finally, spending time in the United Nations building and near the Russian embassy in order to be sure that he could understand the mental processes involved.

Now, science has a language of its own. Or, rather, a multiplicity of languages, each derived partly from the native language of the various scientific groups and partly of borrowings from other languages. In the physical sciences especially, the language of mathematics is a further addition.

More than that, the practice of the scientific method automatically induces a thought pattern that is different from the type of thought pattern that occurs in the mind of a person who is not scientifically oriented.

Lenny's mind was a long way from being scientifically oriented. Worse, he was a bigot. He not only didn't know why the light in his room went on when he flipped the switch, he didn't *want* to know. To him, science was just so much flummery, and he didn't want his brain cluttered up with it.

Facts mean nothing to a bigot. He has already made up his mind, and he doesn't intend to have his solid convictions disturbed by anything so unimportant as a contradictory fact. Lenny was of the opinion that all mathematics was arcane gobbledygook, and his precise knowledge of the mathematical odds in poker and dice games didn't abate that opinion one whit. Obviously, a mind like that is utterly incapable of understanding a projected thought of scientific content; such a thought bounces off the impregnable mind shield that the bigot has set up around his little area of bigotry.

Colonel Spaulding had been aware of these circumstances since the inception of Operation Mapcase. Even though he, himself, had never experienced telepathy more than half a dozen times in his life, he had made a study of the subject and was pretty well aware of its limitations. The colonel might have dismissed—as most men do—his own fleeting experiences as “coincidence” or “imagination” if it had not been for the things he had seen and felt in Africa during World War II. He had only been a captain then, on detached duty with British Intelligence, under crusty old Colonel Sir Cecil Haversham, who didn't believe a word of “all that mystic nonsense.” Colonel Haversham had made the mistake of alienating one of the most powerful of the local witch doctors.

The British Government had hushed it all up afterwards, of course, but Spaulding still shuddered when he

thought of the broken-spirited, shrunken caricature of his old self that Colonel Haversham had become after he told the witch doctor where to get off.

Spaulding had known that there were weaknesses in the telepathic communication linkage that was the mainspring of Operation Mapcase, but he had thought that they could be overcome by the strengths of the system. Lenny had no blockage whatever against receiving visual patterns and designs. He could reproduce an electronic wiring diagram perfectly because, to him, it was not a grouping of scientific symbols, but a design of lines, angles, and curves.

At first, it is true, he had had a tendency to change them here and there, to make the design balance better, to make it more aesthetically satisfying to his artistic eye, but that tendency had been easily overcome, and Colonel Spaulding was quite certain that that wasn't what was wrong now.

Still—

“Lenny,” he said carefully, “are you sure you didn't jigger up those drawings to make 'em look prettier?”

Lenny Poe gave the colonel a look of disgust. “Positive. Rafe checked 'em over every inch of the way as I was drawing them, and he rechecked again last night—or this morning—on those photostats Davenport gave us. That's when he said that there was something wrong with the translations.”

“But he couldn't make it clear just what was wrong, eh?”

Lenny shrugged. "How anybody could make any sense out of that gobbledegook is beyond me."

The colonel blew out a cloud of cigar smoke and looked thoughtfully at the ceiling. As long as the diagrams were just designs on paper, Lenny Poe could pick them up fine. Which meant that everything was jim-dandy as long as the wiring diagrams were labeled in the Cyrillic alphabet. The labels were just more squiggles to be copied as a part of the design.

But if the labels were in English, Lenny's mind would try to "make sense" out of them, and since scientific concepts did *not* "make sense" to him, the labels came out as pure nonsense. In one of his drawings, a lead wire had been labeled "simply ground to powder," and if the original drawing hadn't been handy to check with, it might have taken quite a bit of thought to realize that what was meant was "to power supply ground." Another time, a GE 2N 188A transistor had come out labeled GEZNISSA. There were others—much worse.

Russian characters, on the other hand, didn't have to make any sense to Lenny, so his mind didn't try to force them into a preconceived mold.

Lenny unzipped the leather portfolio he had brought with him—a specially-made carrier that looked somewhat like an oversized brief case.

"Maybe these'll help," he said.

"We managed to get two good sketches of the gadget—at least, as much of it as that Russian lady scientist has put together so far. I kind of like the rather abstract effect you get from all those wires snaking in and around, with that green glass tube in the center. Pretty, isn't it?"

"Very," said the colonel without conviction. "I wonder if it will help Davenport any?" He looked at the pictures for several seconds more,



then, suddenly, his eyes narrowed. "Lenny—this piece of green glass—the thing's shaped like the letter Q."

"Yeah, sort of. Why?"

"You said it was a tube, but you didn't make it look hollow when you drew it."

"It isn't; it's solid. Does a tube have to be hollow? Yeah, I guess it does, doesn't it? Well, then, it isn't a tube."

Colonel Spaulding picked up the phone and dialed a number.

"Colonel Spaulding here," he said after a moment. "Let me speak to Dr. Davenport." And, after a wait: "This is Colonel Spaulding, doctor. I think we may have something for you."

"Good morning, colonel. I'm glad to hear that. What is it?"

"That Q-shaped gadget—the one that you said was supposed to be painted emerald green. Are you *sure* that's the right translation of the Russian?"

"Well . . . uh—" Davenport hesitated. "I can't be sure on my own say-so, of course. I don't understand Russian. But I assure you that Mr. Berensky is perfectly reliable."

"Oh, I have no doubt of that," Colonel Spaulding said easily. "But, tell me, does Mr. Berensky know how to read a circuit diagram?"

"He does," Davenport said, somewhat testily. "Of course, he wasn't shown the diagram itself. We had the Russian labels copied, and he translated from a list."

"I had a sneaking suspicion that was it," said Spaulding. "Tell me, doctor, what does L-E-A-D spell?"

"Lead," said the doctor promptly, pronouncing it *lead*. Then, after a pause, he said: "Or lead," this time pronouncing it *led*. "It would depend on the context."

"Suppose it was on a circuit diagram," the colonel prompted.

"Then it would probably be *lead*. What's all this leading up to, colonel?"

"Bear with me. Suppose you had a cable coming from a storage battery, and you wanted to make sure that the cable was reasonably resistant to corrosion, so you order it made out of the metal, lead. It would be a *led lead*, wouldn't it?"

"Um-m-m . . . I suppose so."

"You might get pretty confused if you didn't have a circuit diagram in front of you to tell you what the label was talking about, mightn't you?"

"I see what you mean," the scientist said slowly. "But we can't show those circuit diagrams to Berensky. The Secretary of Defense himself has classified them as Class Triple-A Ultra-Hyper Top Secret. That puts them just below the Burn-The-Contents-Before-Reading class, and Berensky doesn't have that kind of clearance."

"Then get somebody else," Colonel Spaulding said tiredly. "All you need is a man who can understand technical Russian and can read a circuit schematic and has a top-level secrecy clearance. If we haven't got at least one man in these United States with such simple qualifications as those, then we might as well give the country over to the Reds or back to the

Redskins, since our culture is irretrievably doomed." And he lowered the phone gently to its cradle.

"There's no such word as 'irretrievably,'" Lenny pointed out.

"There is now," said Colonel Spaulding.

Raphael Poe moseyed through the streets of Moscow in an apparently aimless manner. The expression on his face was that of a reasonably happy moron.

His aimless manner was only apparent. Actually, he was heading toward the Lenin Soviet People's Higher Research Laboratories. Dr. Sonya Borisovna Malekrinova would be working late this evening, and he wanted to get as close as possible in order to pick up as much information as he could.

Rafe had a great deal of admiration for that woman, he admitted to himself. She was, granted, as plain as an unsalted *matzoh*. No. That was an understatement. If it were possible to die of the uglies, Sonya Borisovna would have been dangerously ill.

Her disposition did nothing to alleviate that drawback. She fancied herself as cold, hard, analytical, and ruthless; actually, she was waspish, arrogant, overbearing, and treacherous. What she considered in herself to be scientific detachment was really an isolation born of fear and distrust of the entire human race.

To her, Communism was a religion; "*Das Kapital*" and "*The Com-*

munist Manifesto" were holy writ enshrining the dogmata of Marxism-Leninism, and the conflict with the West was a *jehad*, a holy war in which God, in His manifestation as Dialectic Materialism, would naturally win out in the end.

All of which goes to show that a scientific bent, in itself, does not necessarily keep one from being a bigot.

Rafe's admiration for the woman stemmed solely from the fact that, in spite of all the powerful drawbacks that existed in her mind, she was still capable of being a brilliant, if somewhat erratic scientist.

There was a more relaxed air in Moscow these days. The per capita production of the Soviet Union still did not come up to that of the United States, but the recent advances in technology did allow a feeling of accomplishment, and the hard drive for superiority was softened a trifle. It was no longer considered the height of indolence and unpatriotic time-wasting to sit on a bench and feed pigeons. Nor was food so scarce and costly that throwing away a few bread crumbs could be considered sabotage.

So Rafe Poe found himself a quiet corner near the Lenin Soviet People's Laboratories, took out a small bag of dried breadcrumbs, and was soon surrounded by pigeons.

Dr. Malekrinova was carefully calibrating and balancing the electronic circuits that energized and activated and controlled the output of the newly-intalled beam generator—a

ring of specially-made greenish glass that had a small cylinder of the same glass projecting out at a tangent. Her assistant, Alexis, a man of small scientific ability but a gifted mechanic, worked stolidly with her. It was not an easy job for Alexis; Sonya Borisovna was by no means an easy woman to work with. There was, as there should have been, a fifty-fifty division in all things—a proper state of affairs in a People's Republic. Alexis Andreyevitch did half the physical work, got all the blame when things went wrong, and none of the credit when things went right. Sonya Borisovna got the remaining fifty per cent.

Sonya Borisovna Malekrinov had been pushing herself too hard, and she knew it. But, she told herself, for the glory of the Soviet peoples, the work must go on.

After spending two hours taking down instrument readings, she took the results to her office and began to correlate them.

Have to replace that 140-9.0 micromicrofarad frequency control on stage two with something more sensitive, she thought. *And the field modulation coils require closer adjustment.*

She took off her glasses and rubbed at her tired eyes while she thought. *Perhaps the 25 microfarad, 12 volt electrolytic condenser could be used to feed the pigeons, substituting a breadcrumb capacitor in the sidewalk circuit.*

She opened her eyes suddenly and stared at the blank wall in front of her. "Pigeons?" she said wondering-

ly. "Breadcrumb capacitor? Am I losing my mind? What kind of nonsense is that?"

She looked back down at her notes, then replaced her glasses so that she could read them. Determined not to let her mind wander in that erratic fashion again, she returned her attention to the work at hand.

She found herself wondering if it might not be better to chuck the whole job and get out while the getting was good. *The old gal,* she thought, *is actually tapping my mind! She's picking up everything!*

Sonya Borisovna sat bolt upright in her chair, staring at the blank wall again. "Why am I thinking such nonsense?" she said aloud. "And why should I be thinking in English?" When her words registered on her ears, she realized that she was actually *speaking* in English. She was thoroughly acquainted with the language, of course, but it was not normal for her to think in it unless she happened to be conversing with someone in that tongue.

The first whisper of a suspicion began to take form in the mind of Dr. Sonya Borisovna Malekrinova.

Half a block away, Raphael Poe emptied the last of his breadcrumbs on the sidewalk and began walking away. He kept his mind as blank as possible, while his brow broke out in a cold sweat.

That," said Colonel Julius Spaulding scathingly, "is as pretty a mess as I've seen in years."

"It's a breadboard circuit, I'll admit," Dr. Davenport said defensively, "but it's built according to the schematics you gave us."

"Doctor," said the colonel, "during the war the British dropped our group a radio transmitter. It was the only way to get the stuff into Africa quickly. The parachute failed to open. The transmitter fell two thousand feet, hit the side of a mountain, and tumbled down another eight hundred feet. When we found it, four days later, its wiring was in better shape than that thing is in now."

"It's quite sufficient to test the operation of the device," Davenport said coldly.

Spaulding had to admit to himself that it probably was. The thing was a slapdash affair—the colonel had a strong feeling that Davenport had assigned the wiring job to an apprentice and give him half an hour to do the job—but the soldering jobs looked tight enough, and the components didn't look as though they'd all been pulled out of the salvage bin. What irritated Colonel Spaulding was Davenport's notion that the whole thing was a waste of time, energy, money, and materials, and, therefore, there was no point in doing a decent job of testing it at all.

He was glad that Davenport didn't know how the information about the device had been transported to the United States. As it was, he considered the drawings a hoax on the part of the Russians; if he had been told that they had been sent telepathically, he would probably have gone into

fits of acute exasperation over such idiocy.

The trouble with Davenport was that, since the device didn't make any sense to him, he didn't believe it would function at all.

"Oh, it will do *something*, all right," he'd said once, "but it won't be anything that needs all that apparatus. Look here—" He had pointed toward the schematic. "Where do you think all that energy is going? All you're going to get is a little light, a lot of heat, and a couple of burned out coils. I could do the same job cheaper with a dozen 250 watt light bulbs."

To be perfectly honest with himself, Spaulding had to admit that he wasn't absolutely positive that the device would do anything in particular, either. His own knowledge of electronic circuitry was limited to ham radio experience, and even that was many years out of date. He couldn't be absolutely sure that the specifications for the gadget hadn't been garbled in transmission.

That Q-shaped gizmo, for instance. It had taken the better part of a week for Raphael Poe to transmit the information essential to the construction of that enigmatic bit of glass.

Rafe had had to sit quietly in the privacy of his own room and print out the specifications in Russian, then sit and look at the paper while Lenny copied the "design." Then each paper had to be carefully destroyed, which wasn't easy to do. You don't go around burning papers in a crowded

Russian tenement unless you want the people in the next room to wonder what you're up to.

Then the drawings Lenny had made had had to be translated into English and the piece carefully made to specifications.

Now here it was, all hooked up and, presumably, ready for action. Colonel Spaulding fervently hoped there would *be* some action; he didn't like the smug look on Dr. Amadeus Davenport's face.

The device was hooked up on a testing-room circuit and controlled from outside. The operation could be watched through a heavy pane of bulletproof glass. "With all that power going into it," Davenport said, "I don't want anyone to get hurt by splatters of molten metal when those field coils blow."

They went outside to the control console, and Dr. Davenport flipped the energizing switch. After the device had warmed up on low power, Davenport began turning knobs slowly, increasing the power flow. In the testing room, the device just sat there, doing nothing visible, but the meters on the control console showed that something was going on. A greenish glow came from the housing that surrounded the Q-shaped gadget.

"Where the Russians made their mistake in trying to fool anyone with that thing was in their design of that laser component," said Dr. Davenport. "Or, I should say, the thing that

is supposed to look like a laser component."

"Laser?" said Colonel Spaulding uncomprehendingly.

"It means 'light amplification by stimulated emission of radiation,'" Davenport explained. "Essentially, a laser consists of a gas-filled tube or a solid ruby bar with parallel mirrors at both ends. By exciting the atoms from outside, light is generated within the tube, and some of it begins to bounce back and forth between the mirrors at the ends. This tends to have a cascade effect on the atoms which have picked up the energy from outside, so that more and more of the light generated inside the tube tends to be parallel to the length of the tube. One of the mirrors is only partially silvered, and eventually the light bouncing back and forth becomes powerful enough to flash through the half-silvered end, giving a coherent beam of light."

"Maybe that's what this is supposed to be," said the colonel.

Davenport chuckled dryly. "Not a chance. Not with an essentially circular tube that isn't even silvered."

Lenny Poe, the colonel noticed, wasn't the only person around who didn't care whether the thing he referred to as a "tube" was hollow or not.

"Is it doing anything?" Colonel Spaulding asked anxiously, trying to read the meters over Davenport's shoulder.

"It's heating up," Davenport said dryly.

Spaulding looked back at the ap-

paratus. A wisp of smoke was rising slowly from a big coil.

A relay clicked minutely.

WHAP!

For a confused second, everything seemed to happen at once.

But it didn't; there was a definite order to it.

First, a spot on the ceramic tile wall of the room became suddenly red, orange, white hot. Then there was a little crater of incandescent fury, as though a small volcano had erupted in the wall. Following that, there was a sputtering and crackling from the innards of the device itself, and a cloud of smoke arose suddenly, obscuring things in the room. Finally, there was the crash of circuit-breakers as they reacted to the overload from the short circuit.

There was silence for a moment, then the hiss of the automatic fire extinguishers in the testing room as they poured a cloud of carbon dioxide snow on the smoldering apparatus.

"There," said Davenport with utter satisfaction. "What did I tell you?"

"You didn't tell me this thing was a heat-ray projector," said Colonel Spaulding.

"What are you talking about?" Dr. Davenport said disdainfully.

"Develop the film in those automatic cameras," Spaulding said, "and I'll show you what I'm talking about!"

As far as Colonel Spaulding was concerned, the film showed clearly what had happened. A beam of energy had leaped from the "tail" of the

Q-tube, hit the ceramic tile of the wall, and burned its way through in half a second or so. The hole in the wall, surrounded by fused ceramic, was mute evidence of the occurrence of what Spaulding had seen.

But Dr. Davenport pooh-poohed the whole thing. Evidence to the contrary, he was quite certain that no such thing had happened. A piece of hot glass from a broken vacuum tube had done it, he insisted.

A piece of hot glass had burned its way through half an inch of tile? And a wall?

Davenport muttered something about the destructive effects of shaped charges. He was more willing to believe that something as wildly improbable as that had happened than admit that the device had done what Colonel Spaulding was quite certain it had done.

Within three hours, Davenport had three possible explanations of what had happened, each of which required at least four unlikely things to happen coincidentally.

Colonel Spaulding stalked back to his office in a state of angry disgust. Just because the thing was foreign to Davenport's notions, he had effectively tied his own hands—and Colonel Spaulding's, too.

"Where's Lenny Poe?" he asked the WAC sergeant. "I want to talk to him."

She shook her head. "I don't know, sir. Lieutenant Fesner called in half an hour ago. Mr. Poe has eluded them again."

Colonel Spaulding gazed silently



at the ceiling for a long moment. Then: "Sergeant Nugget, take a letter. To the President of the United States, 1600 Pennsylvania Avenue, Washington, D.C.

"Dear Sir. Consider this my resignation. I have had so much experience with jackasses lately that I have decided to change my name to Hackenbush and become a veterinarian. Yours truly, et cetera. Got that?"

"Yes, sir," said the sergeant.

"Burn it. When Fumblefingers Fesner and his boys find Lenny Poe again, I want to know immediately."

He stalked on into his office.

Raphael Poe was beginning to feel distinctly uncomfortable. Establishing a close rapport with another mind can be a distinct disadvantage at times. A spy is supposed to get information without giving any; a swapping of information is not at all to his advantage.

It was impossible to keep his mind a perfect blank. What he had to do was keep his strongest surface thoughts entirely on innocuous things. The trouble with that was that it made it extremely difficult to think about some way to get out of the jam he was in. Thinking on two levels at once, while not impossible, required a nicety of control that made wire-walking over Niagara look easy.

The thing to do was to make the surface thoughts automatically repetitive. A song.

*"In a hall of strange description
(Antiquarian Egyptian),*

*Figuring his monthly balance
sheet, a troubled monarch sat
With a frown upon his forehead,
hurling interjections horrid
At the state of his finances, for
his pocketbook was flat."*

Simultaneously, he kept a picture in his mind's eye. It had to be something vivid that would be easy to concentrate on. The first thing that came to mind was the brilliant necktie that the President had used in his test several months before. He conjured it up in all its chartreuse glory, then he animated it. Mauve satyrs danced with rose-pink nymphs and chased them over the yellow-green landscape.

*"Not a solitary single copper cent
had he to jingle*

*In his pocket, and his architects
had gone off on a strike,*

*Leaving pyramids unfinished, for
their wages had diminished,*

*And their credit vanished like-
wise, in a way they didn't
like."*

Rafe could tell that Dr. Malek-rinova's mind was trying to reject the alien ideas that were coming into her mind. She wasn't consciously trying to pick up Rafe's thoughts. But the rejection was ineffective because of its fascination. The old business about the horse's tail. If you see a white horse, you'll soon get rich if you can keep from thinking about the horse's tail until it's out of sight. The first thought that comes to mind is: "I mustn't think about the horse's tail." A self-defeating proposition.

If Sonya Borisovna had been cer-

tain that she was receiving the thoughts telepathically, she might have been able to reject them. But her mind rejected the idea of telepathy instead, so she was susceptible to the thoughts because she thought they were her own.

The cavorting of the nymphs and satyrs became somewhat obscene, but Rafe didn't bother to correct it. He had more to worry about than offending the rather prim mind of Dr. Malekrinova.

*"It was harder for His Royal Highness than for sons of toil,
For the horny-handed workmen
only ate three figs per day,
While the King liked sweet potatoes,
puddings, pies, and
canned tomatoes,
Boneless ham, and Bluepoint
oysters cooked some prehistoric way."*

What to do now? Should he try to get out of Russia? Was there any quick way out?

He had all the information he needed on the heat-beam projector that Dr. Malekrinova was building. The theory behind it was perfectly clear; all it needed was further experimentation. If it worked out according to theory, it would be an almost perfect defense against even the fastest intercontinental ballistic missiles.

"As he growled, the Royal grumbler spied a bit of broken tumbler

In a long undusted corner just behind the chamber door.

*When his hungry optics spied it,
he stood silently and eyed it,*

Then he smote his thigh with ecstasy and danced about the floor."

Maybe he should try to make a run for the American Embassy. No. No one there knew him, and they probably couldn't get him out of the country, anyway. Besides, it would take him too long to explain the situation to them.

"By the wit Osiris gave me! This same bit of glass shall save me!

I shall sell it as a diamond at some stupendous price!

And who'er I ask to take it will find, for his own sweet sake, it Will be better not to wait until I have to ask him twice!"

The theory behind the heat projector was simply an extension of the laser theory, plus a few refinements. Inside a ring made of the proper material, the light, acted upon by exterior magnetic fields, tended to move in a circle, so that the photon cascade effect was all in one direction instead of bouncing back and forth between a pair of mirrors. That light could be bent around corners by making it travel through a glass rod was well known, and the Malekrinova Q-tube took advantage of that effect.

In a way, the principle was similar to that of the cyclotron, except that instead of spinning ions around in a circle to increase their velocity a beam of coherent light was circulated to increase its intensity.

Then, at the proper moment, a beam of intense coherent light shot

out of the tangent that formed the tail of the Q-tube. If the material of the Q was properly constructed and contained atoms that fluoresced strongly in the infra red, you had a heat beam that delivered plenty of power. And, since the radiation was linear and "in step," the Q-tube didn't heat up much at all. The cascade effect took most of the energy out as radiation.

*"Then a Royal Proclamation was
dispatched throughout the
nation,*

*Most imperatively calling to ap-
pear before the King,*

*Under penalties most cruel, every
man who sold a jewel*

*Or who bought and bartered
precious stones, and all that
sort of thing."*

But knowing all that didn't help Raphael Poe or the United States of America one whit if the information couldn't be gotten out of Russia and into Colonel Spaulding's hands. Lenny had told him of the trouble the colonel was having with Dr. Davenport.

If he could only communicate with Lenny! But if he did, Dr. Malekri-nova would pick up every bit of it, and that would be the end of that. No, he had to figure out some way to get himself and the information both out of the country.

Meanwhile, he had to keep thinking of an animated necktie. And he had to keep singing.

*"Thereupon, the jewelers' nether
joints all quaked and knocked
together,*

*As they packed their Saratogas
in lugubrious despair.*

*It was ever their misfortune to be
pillaged by extortion,
And they thought they smelled
a rodent on the sultry desert
air."*

Lenny Poe shoved open the door of Colonel Spaulding's outer office with a violence that startled Sergeant Nugget.

"Is Spaulding in?" he barked.

"I think he's expecting you," she said. There was no time to buzz the colonel; Poe was already opening the door.

"Rafe's in trouble!" Lenny said hurriedly, slamming the door behind him.

"Where have you been?" snapped the colonel.

"Never mind that! Rafe's in trouble, I said! We've gotta figure a way to get him out of it!"

Colonel Spaulding dropped all thought of bawling out Poe. "What'd he say? What's the trouble?"

"All he's doing is broadcasting that necktie—like an animated cartoon in technicolor. And he's singing."

"Singing? Singing what?"

*"As they faced the Great Pro-
pylon, with an apprehensive
smile on,*

*Sculptured there in heiro-
glyphics six feet wide and
nine feet high*

*Was the threat of King Rameses
to chop every man to pieces*

Who, when shown the Royal diamond, would dare refuse to buy."

Colonel Spaulding blinked. "That's pretty. What does it mean?"

"Nothing; it's a song, that's all. That female Russian scientist can read Rafe's mind, and he's broadcasting this stuff to cover up!"

Quickly, he told Spaulding what the situation was as he had been able to piece it together from Rafe's secondary thoughts.

"Ye Gods!" Colonel Spaulding slapped at his brow. Then he grabbed for the telephone and started dialing.

Lenny dropped into one of the nearby chairs, closed his eyes, and concentrated.

Rafe! Rafe! Listen to me! Rafe!

"Then the richest dealer, Mulai Hassan, eyed the gem and coolly

said, "The thing is but a common tumbler-bottom, nothing more!"

Whereupon, the King's Assassin drew his sword, and Mulai Hassan

Never peddled rings again upon the Nile's primeval shore."

But below the interference came Rafe's thoughts. And the one thing of primary importance to him was to get the information on the heat-beam generator to the United States.

No bigotry, no matter how strong, is totally impregnable. Even the most narrow-minded racial bigot will make an exception if a person of the despised race risks his own life

to save the life of the bigot or someone the bigot loves. The bigotry doesn't collapse—not by a long shot. But an exception is made in that one case.

Lenny Poe made an exception. Any information that was worth his brother's life was *Important!* Therefore, it was not, could not be, scientific gobbledegook, no matter how it sounded.

Rafe, give it to me! Try me! I can copy it!

"Then Abdullah abd Almahdi faintly said the stone was shoddy,

But he thought that, in a pinch, he might bid fifty cents himself.

There ensued a slight commotion were he could repent the notion,

And Abdullah was promoted to the Oriental Shelf."

Rafe! Stop singing that stupid song and give me the stuff! She can't learn anything if you just think about that theory stuff. She already knows that! Come on! Give!

Lenny Poe grabbed a pencil and a sheaf of paper from the colonel's desk and began writing frantically as the *Song of the Egyptian Diamond* stopped suddenly.

Words. Nonsense words. That's all most of the stuff was to Lenny. It didn't matter. He spelled them as he thought they should be, and if he made a mistake, Rafe would correct him.

Rafe tried to keep a picture of the words as they would look if printed while he thought them verbally, and that helped. The information came across in the only way it could come across—not as concepts, but as symbols.

Lenny hardly noticed that the Secretary of Defense and the President had come into the room. He didn't even realize that Colonel Spaulding was feeding him fresh sheets of paper.

Lenny didn't seem to notice the time passing, nor the pain in his hand as the muscles tired. He kept writing. The President left with the Defense Secretary and came back again after a while, but Lenny ignored them.

And when it was over, he pushed pencil and paper aside and, massaging his right hand with his left, sat there with his eyes closed. Then, slowly, a smile spread over his face.

"Well, I'll be damned," he said slowly and softly.

"Mr. Poe," said the President, "is there any danger that your brother will be captured within the next hour?"

Lenny looked up with a startled grin. "Oh. Hi. I didn't notice you, Mr. President. What'd you say?"

The President repeated his question.

"Oh. No. There's nothing to worry about. The little men in white coats came after Dr. Malekrinova. She started screaming that telepathic spies were stealing her secret. She smashed all her apparatus and burned all her papers on top of the

wreckage before they could stop her. She keeps shouting about a pink-and-purple orgy and singing a song about glass diamonds and Egyptian kings. I wouldn't say she was actually insane, but she is *very* disturbed."

"Then your brother is safe?"

"As safe as he ever was, Mr. President."

"Thank Heaven for that," said the President. "If they'd ever captured him and made him talk—" He stopped. "I forgot," he said lamely after a moment.

Lenny grinned. "That's all right, Mr. President. I sometimes forget it myself. But it was his handicap, I guess, that made him concentrate on telepathy, so that he doesn't need his ears to hear what people are saying. Maybe I could read minds the way he does if I'd been born that way.

"Come to think of it, I doubt if the Russians would have believed he was a spy if they'd caught him, unless they really did believe he was telepathic. A physical examination would show immediately that he was born without eardrums and that the inner ear bones are fused. They wouldn't try to make a man talk if an examination showed that he really was a deaf-mute."

The buzzer on the colonel's intercom sounded. "Yes?" said Spaulding.

"Dr. Davenport is here," said Sergeant Nugget. "He wants to talk to you."

"Send him in," said Colonel Spaulding gleefully. "I have a nice scientific theory I want to shove down his throat." ■

SLEIGHT OF WIT

NATURALLY THE MOST DANGEROUS OF ALL SECRET WEAPONS IS THE ONE THAT CAN BE PERCEIVED AND UNDERSTOOD ONLY AFTER IT HAS BEEN USED ON ONE . . .

BY GORDON DICKSON

It was a good world. It was a very good world—well worth a Class A bonus. Hank Shallo wiped his lips with the back of one square, hairy, big-knuckled hand, put his coffee cup down; and threw his ship into orbit around the place. The orbit had a slight drift to it because the gryos needed overhauling; but Hank was used to their anomalies, as he was to the fact that the coffee maker had to be set lower on the thermostat than its direction called for. He made automatic course corrections while he looked the planet over for a place to sit down.

Hank was a world-scout—an interstellar pioneer far-flung in his fleet one-man spacecraft in search of new homes for humanity. He had been picked to model as such for a government publicity release the last

time he had been back to Earth. The picture that resulted, in three-dimensional full-color, showed Hank barrel-chested in a fitted blue uniform, carelessly open at the throat, seated at the gleaming controls of a scout cabin mock-up. Utilitarianly tidy, the little cabin surrounded him, from the folded up Pullman-type bunk to the arms rack with well-oiled weapons gleaming on their hooks. A battered guitar leaned in one corner.

True life showed differences—Hank, barrel-chested in a pair of khaki shorts, seated at the somewhat rubbed-down controls of the *Andnowyou dont*. Utilitarianly untidy, the little cabin surrounded him, from the anchored down and unmade bunk to the former arms rack, with well-oiled spade, ax, post-hole digger, wire-clippers, et cetera, hanging from the hooks. (In the ammunition locker were five sticks of non-issue dynamite. Hank, when talking shop on his infrequent trips back home, was capable of waxing lyrical over dynamite. "A tool," he would call it—a weapon. It'll dig for you, fight for you, run a bluff for you. The only thing it won't do for you is cook the meals and make the bunk.")

A battered guitar leaned in one corner.

On the ninth time around, Hank had complete surface maps of the world below. He ran them back through the ship's library and punched for that spot on one of the world's three continents where landing conditions were optimum. Then he turned everything over to the au-

tomatic pilot and took a little nap.

When instinct woke him up, *Andnowyou dont* was just balancing herself in for a landing in a little meadow surrounded by trees and pleasant-looking enough to be parklike. What hint of warning it was that reached him in the midst of his slumber he was never to know; but one moment he was asleep—and the next he was halfway to the control panel.

Then concussion slammed the ship like a giant's hand. He tripped, caught one glimpse of the near wall of the cabin tilting at him, and consciousness dissolved in one of the prettiest displays of shooting stars he had seen in some time.

He woke again—this time to a throbbing headache and a lump on his forehead. He sat up groggily, hoisted himself the rest of the way to his feet and stumped over to the medicine chest, absently noting that the ship was, at least, still upright. The outside screen was on, showing a view of the meadow. Five years before he would have looked out of it immediately. Now he was more interested in aspirin.

When he had the aspirin inside him and had checked to make sure the bump on his head was not bleeding and the guitar had not been damaged he turned at last to the screen, sat down in the pilot chair and swept the outside scanner about the meadow. The meadow turned before him, stopped, and the screen steadied on a tall, gray shape.

At the far end of the meadow was another ship. It was half again as big as the *Andnowyoudont*, it resembled no ship of human manufacture that Hank had ever seen; and it had a sort of metal bubble or turret where its nose should be. From this turret projected a pair of short, blunt wide-mouthed tubes bearing an uncomfortable resemblance to the muzzles of guns. They were pointed directly at the *Andnowyoudont*.

Hank whistled the first three notes of "There'll Be A Hot Time In The Old Town, Tonight"—and broke off rather abruptly. He sat staring out the screen at the alien spaceship.

"Now," he said, after a while to the room around him, "against this—the odds against this happening, both of us here at the same time, in the same place, must be something like ten billion to one."

Which was possibly true. But which also, the saying of it didn't help a bit.

Hank got up rather heavily, went over to the coffee maker, and drew himself a cup of coffee. He sat down in his chair before the controls and examined a bank of tell-tale gauges. Not too much to his surprise, these mechanical watchdogs informed him that the *Andnowyoudont* was being sniffed at by various kinds of radiation. He was careful not to touch anything just yet. The thought of the five sticks of dynamite popped into his head and popped out again. The human race's expansion to the stars had brought them before this into contact with some life forms which

might reasonably be called intelligent—but no one before that Hank knew of, in his line of work or out of it, had actually run across what you might call a comparable, *space-going* intelligent race.

"Except now Mrs. Shallo's little boy," said Hank to himself. "Naturally. Of course."

No, it was clearly not a dynamite-resolution type problem. The stranger yonder was obviously armed and touchy. The *Andnowyoudont* packed five sticks of dynamite, a lot of useful, peaceful sorts of tools, and Hank. Hank leaned back in his chair, sipped on his coffee and turned the situation over to the one device on the ship that had a tinker's chance of handling it—some fifty ounces of gray matter just abaft his eyebrows and between his ears.

He was working this device rather hard, when the hull of the *Andnowyoudont* began to vibrate at short intervals. The vibration resulted in a series of short hums or buzzes. Hank plugged in to the ship's library and asked it what it thought of this new development.

The alien ship appears to be trying to communicate with you," the library informed him.

"Well, see if you can make any sense out of its code," Hanks directed. "But don't answer—no yet, anyway."

He went back to his thinking.

One of the less glamorous aspects of Hank's profession—and one that

had been hardly mentioned in the publicity release containing the picture he had modeled for, aforesaid—was a heavy schedule of classes, lectures, and briefing sections he was obligated to attend every time he returned to Headquarters, back on Earth. The purpose of these home chores was to keep him, and others like him, abreast of the latest developments and discoveries that might prove useful to him.

It was unfortunate that this would have meant informing him about practically everything that had happened since his last visit, if the intent had been followed literally. Ideally, a world scout should know everything from aardvark psychology to the Zyrian language. Practically, since such overall coverage was impossible, an effort was made to hit hard only the obviously relevant new information and merely survey other areas of new knowledge.

All new information, of course, was incorporated into the memory crystals of the library; but the trick from Hank's point of view was to remember what to ask for and how to ask for it. Covered in one of the surveys when he had been back last trip had been a rather controversial theory by somebody or other to the effect that an alien space-going race interested in the same sort of planets as humans were, would not only look a lot like, but act a lot like, humans. Hank closed his eyes.

"Bandits," he recited to himself. "Bayberry, barberry, burberry, buckle—May Sixteenth. Sinuses, shamus-

es, cyclical, sops—milk-and-bread . . . Library, Walter M. Breadon's 'Speculations on Alien Responses.'"

There was an almost imperceptible delay, and then a screen in front of Hank lit up with a pictured text.

". . . *Let us amuse ourselves now, (commenced the pictured text) with a few speculations about the personality and nature of a space-going alien such as one of you might encounter . . .*"

Hank snorted and settled down to read.

Twenty minutes later he had confirmed his remembrance of the fact that Breadon thought that an alien, such as must be in the ship opposite Hank right now, would react necessarily very similarly to a human. Because, Breadon's theory ran, of necessarily parallel environments and past stages of development.

At this moment, the call bell on Hank's deep-space receiver rang loudly.

"What's up?" he asked the Library, keying it in.

"The alien ship has evidently concluded that it can speak to you over normal communication equipment. It is calling the *Andnowyoudont*."

"Fine," said Hank. "I wonder what the name of Breadon's opposite number is among the aliens."

"I am sorry. I do not have that information."

"Yeah. Well, stand by to translate." Hank keyed in the communicator board. A screen before him lit up with the image of a hairless individu-

al, lacking even eyebrows; with pronounced bony brow ridges, a wide mouth, no chin to speak of, and what appeared to be a turtleneck sweater drawn high on a thick neck.

This individual stared for a long second; and then began to gobble at him. Eventually he ran down and went back to staring again. Hank, his finger still off the send button, turned to the library.

"What'd he say?"

"I will need more referents. Possibly if you speak now, he will perhaps speak again."

"Not on your life." Hank looked at the alien. The alien looked back. The staring match went on for some time. Abruptly the alien started gobbling again. He gobbled for some time, this time. He also waved a fist in the air. It was a rather slim fist considering the thickness of his neck.

"Well?" demanded Hank of the library, after the figure in the screen had fallen silent a second time.

"First message: 'You are under arrest.'"

"That's *all* he said?"

"Agglutination appears to be a prime characteristic of his language."

"All right—" growled Hank. "Go on."

"Second message: 'You have offended the responsible authorities and their immediate representative, in the person of I who address you. You are arrested and helpless. Submit therefore immediately or you will be utterly destroyed.'"

Hank thought for a minute.

"Translate," he said to the Library.

He pressed the send button. "Tut-tut!" he said to the alien.

"I am unable to translate 'tut-tut,'" said the Library.

"Oh?" Hank grinned. His grin widened. He began to laugh. He laughed louder.

"I am unable to translate laughter," said the Library.

Hank was rolling around in his seat and hiccuping with helpless merriment. He reached out with one hand and slapped the send button to *off*. The screen went dark before him as the still-blankly staring alien faded from view. Whooping, Hank pulled himself to an upright position. Abruptly he stopped.

"What am I doing?" he muttered. "The set's off now." He wiped a damp forehead with the hairy back of one large hand and got up to totter over to one of the food compartments. He opened it and hauled out a large brown bottle.

Liquor was not a normal part of the supply list on scout ships—for reasons of space, rather than those of sobriety, a drinking world scout being a sort of self-canceling problem. On the other hand, a closed cycle that reprocessed waste matter of an organic nature and started it around again to become food required efficient little manufactories that were quite as capable of turning out ersatz beer as ersatz steak. The result was that world scouts were beer drinkers if they were any sort of drinkers at all.

They were also the despair of waiters, waitresses, and bartenders.

A group of world scouts spending a social moment together would order a bottle apiece of cold beer; drain their bottles, when they came, in a couple of seconds; and then sit with the empty bottles before them, refusing to reorder until about forty-five minutes had passed. Then the whole process would be repeated.

A world scout determined to get drunk merely shortened the interval between bottles. One determined to stay cold sober, while appearing to drink, lengthened it. A member of the laity, sitting in with them on these sessions, was normally destroyed—either by drink or frustration.

In this particular case Hank flipped the seal off the top of the bottle in his hand, poured half a liter of beer down his throat, carefully resealed the bottle and put it back in its refrigerator compartment. He then carefully counted the remaining full containers of beer in the compartment and set the beer-producing controls on high.

After this he was almost attacked by another spasm of laughter, but he fought it down. He went over to the desk of controls and flicked on an outside screen. It lit up with a view of the meadow with the afternoon sun beaming down on the soft grass and the tall gunmetal-colored shape of the alien ship.

"A beautiful day," said Hank aloud, "for a picnic."

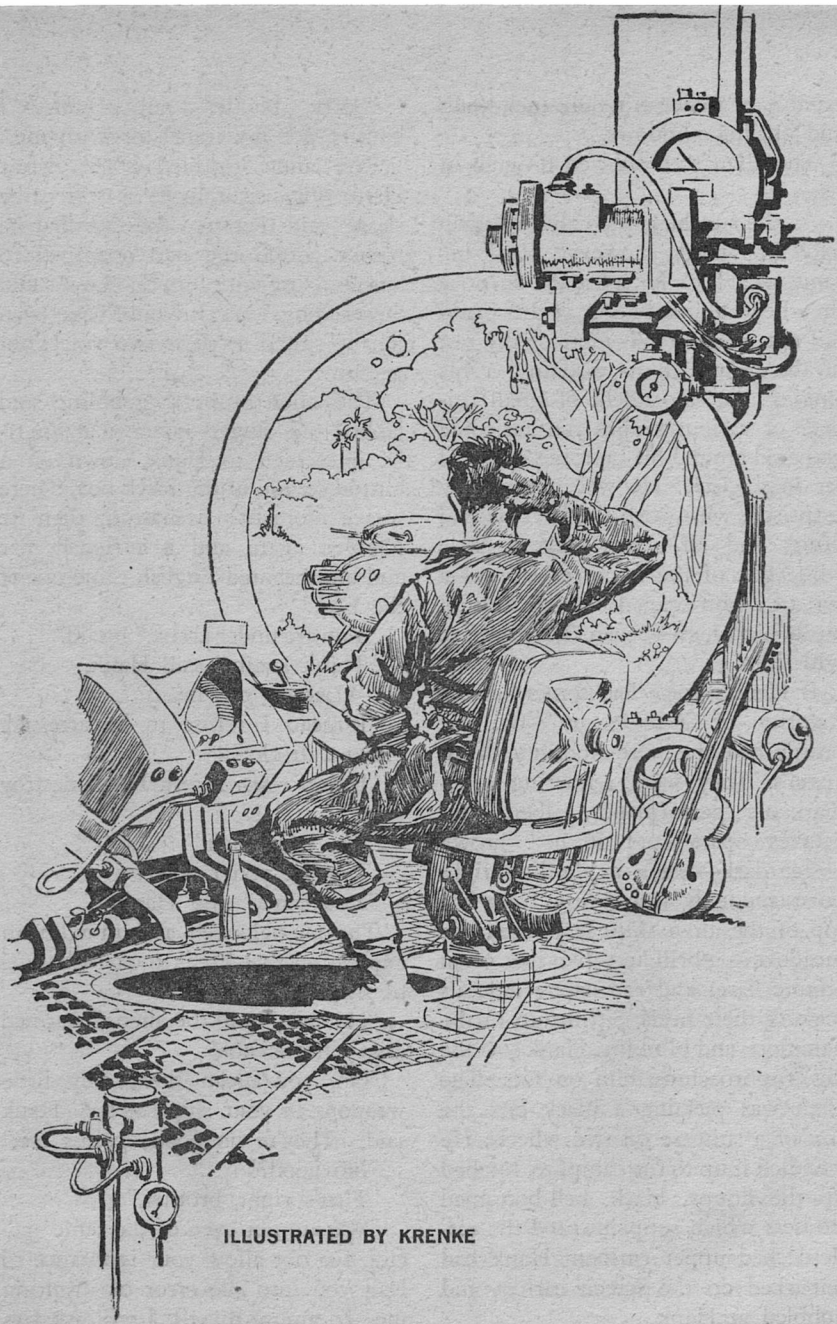
"Do you wish me to make a note of that fact?" inquired the Library, which had been left on.

"Why not?" said Hank. He went cheerfully about the room, opening lockers and taking things out. A sudden thought occurred to him. He went across to the desk controls to check the readings on certain instruments concerned with the physical environment of the world outside—but these gave the meadow a clean bill of health. He added the full bottles of beer to his pile, enclosing them in a temperature bag, and headed out the air lock of his ship.

Reaching the ground outside, he proceeded to a comfortable spot on the grass and about midway between his ship and that of the alien.

Half an hour later, he had a cheerful small fire going in the center of a small circle of stones, a hammock hung on wooden posts, and small conveniences such as a beer-cooler and an insulated box of assorted snacks within easy reach. He lay in the hammock and strummed his guitar and sang. He also swallowed a half liter of beer approximately every thirty-five minutes.

The beer did nothing to improve his voice. There was a reason Hank Shallo sang while off on his lonely trips of exploration—no civilized community could endure the horrendousness of his vocal cords when these vibrated in song. By a combination of bribery and intimidation he had forced an indigent music instructor once to teach him how to stay in key. So, stay in key he did; but the result was still a sort of bass bray



ILLUSTRATED BY KRENKE

capable of penetrating six-inch walls and rattling windows.

The alien ship showed no sign of life.

As the sun began slowly to drown itself in twilight, however, Hank became aware to his pleasant surprise that the local inhabitants of this world did not seem to join most of the rest of the galaxy in its disdain for his singing. An assortment of small animals of various shapes and sizes had gathered around his camping spot and sat in a circle. He was not unduly surprised, what with the beer he had drunk and all, when after a little while one of the larger creatures—a sort of rabbit-shaped beast sitting up on its hind legs—began to harmonize with him.

If Hank's voice had somewhat the sonority of a cross-cut saw, the beast's had the pure liquidity of an angel's. They were rendering a remarkable performance, albeit four octaves apart—and it had grown rather dark—when a blinding light burst suddenly into being from the top of the alien ship. It washed the meadow in a brilliance like that of an atomic flare; and the native animals took to their heels. Sitting up in the hammock and blinking, Hank saw the alien approaching him on foot. The alien was pushing a black box the size of a suitcase on two wheels. He trundled it up to the campfire, hitched up the floppy, black, bell-bottomed trousers which supplemented the turtle-necked upper garment Hank had remarked on the screen earlier, and gobbled at Hank.

"Sorry, buddy," said Hank. "I haven't got my translator with me."

The alien gobbled some more. Hank idly strummed a few stray chords and regretted the fact that he hadn't gotten the native animal to harmonizing with him on "Love's Old Sweet Song," which would have been ideally suited to their two voices together.

The alien stopped gobbling and jabbed one finger—somewhat angrily, it seemed to Hank, down on a button on top of the black box. There was a moment's hesitation; then he gobbled again and a curiously flat and unaccented English came out of the box.

"You are under arrest," it said.

"Think again," said Hank.

"What do you mean?"

"I mean I refuse to be arrested. Have a drink?"

"If you resist arrest, I will destroy you."

"No, you won't."

"I assure you I will."

"You can't," said Hank.

The alien looked at him with an expression that Hank took to be one of suspicion.

"My ship," said the alien, "is armed and yours is not."

"Oh, you mean those silly little weapons in your ship's nose?" Hank said. "They're no good against me."

"No good?"

"That's right, brother."

"We are not even of the same species. Do not allow your ignorance to lead you into the error of insulting me. To amuse myself, I will ask you

why you are under the illusion that the most powerful scientific weapons known have no power against you?"

"I have," said Hank, "a greater weapon."

The alien looked at him suspiciously a second time.

"You are a liar," the box said, after a moment.

"Tut-tut," said Hank.

"What was that last noise you made? My translator does not yet recognize it."

"And it never will."

"This translator will sooner or later recognize every word in your language."

"Not a geepfleich word like *tut-tut*."

"What kind of a word?" It might, thought Hank, be merely false optimism on his part; but he thought the alien was beginning to look a little uncertain.

"Geepfleich—words dealing with the Ultimate Art-Science."

The alien hesitated for a third time.

"To get back to this fantastic claim of yours to having a weapon—what kind of weapon could be greater than a nuclear cannon capable of destroying a mountain?"

"Obviously," said Hank. "The Ultimate Weapon."

"The . . . Ultimate Weapon?"

"Certainly. The weapon evolved on Ultimate Art-Science principles."

"What kind of a weapon," said the alien, "is that?"

"It's quite impossible to explain," said Hank, airily, "to someone having no understanding of the ultimate Art-Science."

"May I see this weapon?"

"You ain't capable of seeing it, kid," said Hank.

"If you will demonstrate its power to me," said the alien, after a pause, "I will believe your claim."

"The only way to demonstrate it would be to use it on you," said Hank. "It only works on intelligent life forms."

He reached over the edge of his hammock and opened another beer. When he set the half-empty bottle down again the alien was still standing there.

"You are a liar," the alien said.

"A crude individual like you," said Hank, delicately wiping a fleck of foam from his upper lip with the back of one hairy hand, "would naturally think so."

The alien turned abruptly and trundled his translator back toward his ship. A few moments later, the overhead light went out and the meadow was swallowed up in darkness except for the feeble light of the fire.

"Well," said Hank, getting up out of the hammock and yawning, "I guess that's that for today."

He took the guitar and went back to his ship. As he was going back in through the air lock, he thought he felt something about the size of a mouse scurry over his foot; and he caught a glimpse of something small, black and metallic that slipped out of

sight under the control desk as he looked at it.

Hank grinned rather foolishly at the room about him and went to bed.

He woke once during the night; and lay there listening. By straining his ears, he could just occasionally make out a faint noise of movements. Satisfied, he went back to sleep again.

Early morning found him out of bed and humming to himself. He flipped the thermostat on the coffee maker up for a quick cup, set up the cabin thermostat and opened both doors of the air lock to let in the fresh morning air. Then he drew his cup of coffee, lowered the thermostat on the coffee maker again and keyed in the automatic broom. The broom scurried about, accumulating a small heap of dust and minor rubble, which it dumped outside the air lock. In the heap, Hank had time to notice, were a number of tiny mobile mechanical devices—like robot ants. Still drinking his coffee, he went over to the drawer that held the operating manual for ships of the class of *And-nowyoudont*. Holding it up by the binding, he shook it. A couple more of the tiny devices fell out; and the automatic broom, buzzing—it seemed to Hank—reproachfully, scurried over to collect them.

Hank was fixing himself breakfast, when the screen announced he was being called from the other ship. He stepped over and answered. The image of the alien lit up on the screen.

"You have had the night to think things over," said the flat voice of the

alien's translator. "I will give you twelve point three seven five nine of your minutes more in which to surrender you and your ship to me. If you have not surrendered by the end of that time, I will destroy you."

"You could at least wait until I've had breakfast," said Hank. He yawned, and shut off the set.

He went back to fixing his breakfast, whistling as he did so. But the whistle ran a little flat; and he found he was keeping one eye on the clock. He decided he wasn't hungry after all, and sat down to watch the clock in the control desk as its hands marked off the seconds toward the deadline.

Nothing happened, however. When the deadline was a good several minutes past, he let out a relieved sigh and unclenched his hands, which he found had been maintaining quite a grip on the arms of his chair. He went back and had breakfast after all.

Then he set the coffee maker to turn itself on as soon as he came in, got down some fresh reading material from the top shelf of his bookcase—giving his head a rather painful bang on the fire-control sprinkler overhead, in the process—and stopped to rub his head and swear at the sprinkler. He then comforted himself with the last cup of coffee that was still in the coffee maker, unplugged the emergency automatic controls so that the air-lock doors would stay open while he was out, loaded himself up with beer—but left the reading material roosting on top

of the coffee maker—and went out to his hammock.

Forty minutes and a liter and a half of beer later, he was again in a good mood. He took an ax into the nearby woods and began chopping poles for a lean-to. By lunch-time his hammock was swinging comfortably in the shade of the lean-to, his guitar was in tune, and his native audience was gathering again. He sang for about an hour, the small, rabbitlike creature harmonizing with parrotlike faithfulness to the tune, and had lunch. He was just about to take a small nap in the hammock when he saw the alien once more trundling his translator in the direction of the camp.

He reached the fireplace and stopped. Hank sat up with his legs over the edge of the hammock.

"Let us talk," said the alien.

"Fine," said Hank.

"I will be frank."

"Fine."

"And I will expect you to be frank."

"Why not?"

"We are both," said the alien, "intelligent beings of a high level of scientific culture. In spite of the apparent differences between us, we actually have a great deal in common. We must consider first the amazing coincidence that caused us both to land on the same world at the same spot at the same time—"

"Not so much of a co-incidence," said Hank.

"What do you mean?" The alien all but glowered at him.

"It stands to reason," Hank leaned back comfortably in the hammock and caught hold of his knee with both hands to balance himself. "Your people and mine have probably been pretty close to bumping into each other all along. They've probably been close to each other a number of times before. But space is pretty big. Your ship and mine could easily zip right by each other a thousand times and never be noticed by one another. The most logical place to bump into each other *is* on a planet we both want. As for coming down in the same place—I set my equipment to pick out the most likely landing spot. I suppose you did the same?"

"It is not my function," said the alien, "to give you information."

"It isn't necessary for you to, either," grunted Hank. "It's pretty obvious your native star and mine aren't too far apart as galactic distances go—and our exploratory ships have been getting closer to the opposing home worlds all the time. Instead of it being such a co-incidence, you might say our meeting was close to inevitable." He cocked an eye at the alien. "And I'm sure you've already figured that out for yourself as well as I did."

The alien hesitated for a moment.

"I see," he said at last, "there is no point in my trying to deceive you."

"Oh you can *try* if you like," said Hank, generously.

"No, I will be absolutely frank."

"Suit yourself."

"You obviously have assessed the situation here as fully and correctly as I have myself. Here we stand, facing each other in an armed truce. There can be no question of either of us allowing the other to carry word of the other's civilization back to his own people. We cannot take the chance that the other's people are not inimical and highly dangerous. It becomes, therefore, the duty of each of us to capture the other." He cocked an eye at Hank. "Am I correct?"

"You're doing the talking," said Hank.

"At the present moment, we find ourselves at an impasse. My ship is possessed of a weapon which, by all the laws of science, should be able to destroy your ship utterly. Logically, you are at my mercy. However, illogically, you deny this."

"Yep," said Hank.

"You lay claim to an invisible weapon which you claim is greater than my own, and puts me at your

mercy. For my own part I believe you are lying. But for the sake of my people I cannot put the matter to a test as things now stand. If I should do so and it should turn out I was wrong, I would be responsible for calamity."

"Yes, indeed," said Hank.

"However, an area of doubt remains in my mind. If you are so sure of the relative superiority of your weapon, why have you hesitated to make me prisoner in your turn?"

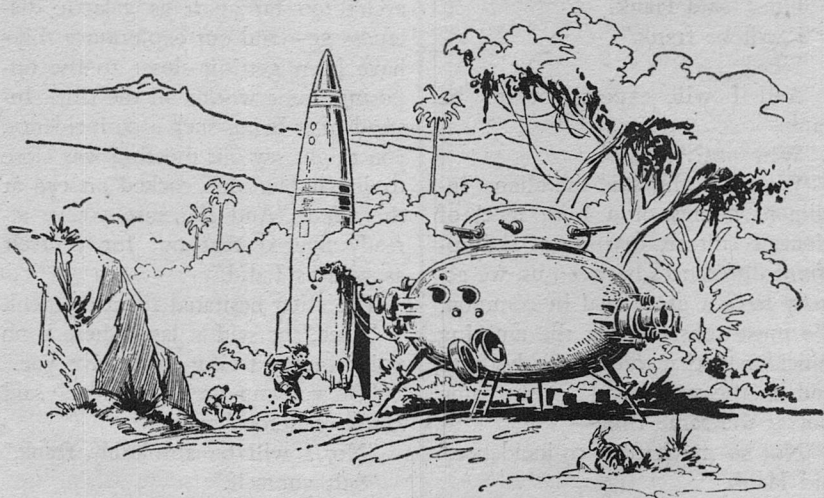
"Why bother?" Hank let go of his knee and leaned forward confidentially with both feet on the ground. "To be frank right back at you—you're harmless. Besides, I'm going to settle down here."

"Settle down? You mean you are going to set up residence here?"

"Certainly. It's my world."

"Your world?"

"Among my people," said Hank, loftily, "when you find a world you like that no one else of our own kind



has already staked out, you get to keep it."

The pause the alien made this time was a very long one indeed.

"Now I know you are a liar," he said.

"Well, suit yourself," said Hank, mildly.

The alien stood staring at him.

You leave me no alternative," said the alien at last. "I offer you a proposition. I will give you proof that I have destroyed my cannon, if you will give me proof that you have destroyed your weapon. Then we can settle matters on the even basis that will result."

"Unfortunately," said Hank, "this weapon of mine can't be destroyed."

"Then," the alien backed off a step and started to turn his translator around back toward the ship. "I must take the chance that you are not a liar and do my best to destroy you after all."

"Hey! Hold on a minute!" said Hank. The alien paused and turned back. "Don't rush off like that." Hank stood up and flexed his muscles casually. The two were about the same height but it was obvious Hank carried what would have been an Earth-weight advantage of about fifty pounds. "You want to settle this man-to-man, I'm willing. No weapons, no holds barred. There's a sporting proposition for you."

"I am not a savage," retorted the alien. "Or a fool."

"Clubs?" said Hank, hopefully.

"No."

"Knives?"

"Certainly not."

"All right," said Hank, shrugging, "have it your way. Go get yourself destroyed. I did my best to find some way out for you."

The alien stood still as if thinking.

"Let me make you a second proposition," he said at last. "All the alternatives you propose are those which give you the advantage. Let us reverse that. Let me propose that we trade ships, you and I."

"What?" squawked Hank.

"You see? You are not interested in any fair encounter."

"Certainly I am! But trade ships—why don't you just ask me to give up right now?"

"Because you obviously will not do so."

"There's no difference between that and asking me to trade ships!" shouted Hank.

"Who knows?" said the alien. "Possibly you will learn to operate my cannon before I learn to operate your weapon."

"You never could anyway—work mine, that is!" snorted Hank.

"I am willing to take my chances."

"It's ridiculous!"

"Very well." The alien turned away. "I have no alternative but to do my best to destroy you."

"Hold on. Hold on—" said Hank. "Look, all right. I agree. Just let me go back to my ship for a minute and pick up a few personal—"

"No. Neither one of us can take the chance of the other setting up a

trap in his own ship. We trade now—without either of us going back to our ships.”

“Well, now look—” Hank took a step toward him.

“Stand back,” said the alien. “I am connected with my cannon by remote controls at this moment.”

“The air-lock doors to my ship are open. Yours aren’t.”

The alien reached out and touched the black box. Behind him, the air-lock door of the alien ship swung open, revealing an open inner door and a dark interior.

“I will abandon my translator at the entrance to your ship,” said the alien. “Is it settled?”

“Settled!” said Hank. He began walking toward the alien ship, looking back over his shoulder. The alien began trundling his black box toward Hank’s ship. As the distance between them widened, they began to put on speed. Halfway to the alien ship, Hank found himself running. He came panting up to the entrance of the alien air lock, and looked back just in time to see the alien dragging his black box in through the air lock of Hank’s ship.

“Hey!” yelled Hank, outraged. “You promised—”

The slam of the outer air-lock door, on his own ship, cut him off in mid-protest. He leaned against the open door of the alien ship’s air lock, getting his breath back. It occurred to him as a stray thought that he was built for power rather than speed.

“I should have walked,” he told the alien ship. “It wouldn’t have made any

difference.” He glanced at his wrist watch. “I’ll give him three minutes. He sure didn’t lose any time finding those air-lock controls.”

He watched the second hand of his watch go around. When it passed the two and a half minute point, he began walking back to his own ship. He reached its closed air-lock door and fumbled with his fingers under the doorframe for the outside lock control button. He found and pressed it.

The door swung open. Smoke spurted out, followed instantly—as the door swung wide—by a flood of water. Washed out on the crest of this escaping flood came a very bedraggled looking alien. He stirred feebly, gargled something at Hank, and collapsed. Inside the spaceship a small torrential shower seemed to be in progress.

Hank hooked one big hand into the alien’s turtleneck upper garment and dragged him back into the ship. Groping around in the downpour, he found the controls for the automatic fire sprinkler system and turned them off. The shower ceased. Hank fanned smoke away from in front of his face, stepped across to the coffee maker and turned it off. He punched buttons to start the ventilating system and close the air-lock doors. Then he set about tying the alien to the bunk.

When the alien began to stir, they were already in null-space, on the first point-to-point jump of the three-day trip that would bring them back to Earth. The alien opened his

eyes; and Hank, looking up from his job of repairing the coffee maker, saw the other's stare full upon him.

"Oh!" said Hank. He stopped work, went across the room and brought back the black box on wheels to within reach of the alien's bound hands. The alien reached out and touched it. The box spoke, echoing his gobble. "What did I do wrong?"

Hank nodded at the coffee maker. He sat down and went back to work on it. It was in bad shape, having evidently suffered some kind of an explosion.

"I had that set to turn on when I came back in," he said. "Closing the air-lock doors turned it on. Convenient little connection I installed about a year or so back. Only, it just so happened I'd drawn the last cup out of it before I went out. There was just enough moisture in it to cause a steam explosion."

"But the water? The smoke?"

"The automatic sprinkling system," explained Hank. "It reacts to any spot of dangerously high temperature in the room here. When the coffee maker split open, the heating element was exposed. The sprinkling system began flooding the place."

"But the smoke?"

"Some burnable reading material I had on top of the coffee maker. Now that" said Hank, finishing his repairs on the coffee maker, "was something I was absolutely counting on—that the books would fall down onto the burner. And they did." He slapped the coffee maker affectionately and

stood up. He looked down at the alien. "Afraid you're going to be somewhat hungry for the next three days or so. But as soon as we get to Earth, you can tell our nutritionists what you eat and they'll synthesize it for you."

He grinned at the other.

"Don't take it so hard," he said. "You'll find we humans aren't all that tough to take when you get to know us."

The alien closed his eyes. Something like a sigh of defeat came from the black box.

"So you had no weapon," it said.

"What do you mean?" said Hank, dropping into the chair at the control board, indignantly. "Of course I had a weapon."

The eyes of the alien flew wide open.

"Where is it?" he cried. "I sent robots in. They examined this ship of yours right down to the elements that hold it together. They found no weapon. I found no weapon."

"You're my prisoner aren't you?" said Hank.

"Of course I am. What of it? What I'm asking is to see your weapon. I could not find it; but you say you still have it. Show it to me. I tell you, I do not see it!"

Hank shook his head sadly; and reached for the controls of the *And-nowyoudont* to set up the next jump.

"Brother," he said. "I don't know. If you don't see it—after all this—then I pity your people when my people really get to know them. That's all I've got to say!" ■

the Reference Library

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P. Schuyler Miller

BURIED TECHNOLOGY

Although wild predictions about the scientific achievements of future generations and other civilizations are a dime a dozen in science fiction—what else, considering the name?—I can't think of one story that has done a workmanlike job of constructing a future technology.

The results of technology, in the form of household devices, vehicles, heating and lighting systems, weapons, mechanized food production, we get in abundance . . . but nothing about the technology that makes them possible. A bare exception is the "Chicken Little" portion of "The Space Merchants," but even there the treatment of what makes that mass of

tissue grow and grow is superficial and incidental to the plot. A kind of exception exists in an early and unforgettable story of Theodore Sturgeon's, the famous "Killdozer," in which the reader has to be shown what a bulldozer can and should do, before he can realize what a bulldozer gone intelligent and lethal can and will do. There may be more, and doubtless are, but they don't stand out in my memory. It may be that here is a whole new untouched area for science fiction to explore, more promising than psi or sociology. It may also be that we just don't have writers who can do it.

What brings this fit of introspection upon me is an excellent book by an oceanographic engineer, which tells the story of the early stages of the plan to drill "A Hole in the Bottom of the Sea." Willard Bascom, the author, is Director of the Mohole project for the National Academy of Sciences. As some rather condescending reviews in professional magazines have taken pains to point out, he is an engineer rather than a "scientist." Whatever he is, he has written an excellent, informative, humorous, thought-provoking book about the reasons behind the plan to drill down to the Mohorovicic discontinuity which separates the thin crust of the Earth from the beginning of the "mantle," the next and greatest geological division of the planet.

I am sure the story of the AMSOC—the American Miscellaneous Society—is familiar to many of you. It has no officers, no constitution, no bylaws, and consequently no red tape to strangle it. These organizational shortcomings also made it impossible for it—as such—to get a hearing among orthodox scientists and fund-granting foundations, but since five of its nine Mohole committeemen were august and respected members of the Academy of Sciences, it has been able to work through that agency.

But—although I commend these aspects of the book to you—it isn't so much the story of AMSOC, or of the hypotheses and data that make it evident that there is a discontinuity in the Earth's structure that comes closest to the surface at the bottom of the sea, that I want to commend to you in this book. It is published by Doubleday, by the way, and costs \$4.95.

In the latter portions of his book, Mr. Bascom reveals a little about the highly developed and sophisticated technology of deep drilling—drilling for oil, primarily—which oceanographers will have to use in drilling the Mohole. Much, or all, of this is undoubtedly taught somewhere, from textbooks of some kind, in engineering colleges, but it was news to the oceanographers and it was news to me. You'll find never a suggestion of it in the textbooks of physics or the popular books and articles on the

development of American science . . . because, in a limited sense, it isn't science. It's technology—know-how. And here, rather than in physics or chemistry, is where the real "secrets" are.

It should be no new idea here that the basic data and laws of physics, chemistry, electronics, *et al* are there for anybody to discover and use. To talk about keeping a scientific phenomenon "secret," for military or other reasons, is basically nonsense. You may delay others' discovery of the same facts and relationships, but you are just as likely to hinder your own work by following a no-information policy. The reports of duplicated work within our own "classified" categories are legion.

Not so—or not necessarily so—with technology. There are likely to be many possible ways of applying the laws of nature, and some ways will be easier, or more economical, or more efficient than others. What the best ways are may be learned by "cold" application of science, but it is more likely to be learned by trial and error and accumulation of trade secrets within an industry. Technological evolutions go to work in ways that are never mentioned in the scientific journals—but that *are* the subject of hot and thoughtful discussions every now and then in "trade" journals that aren't read by scientists or abstracted or even indexed.

In a science-fiction yarn, the hero who decided to drill a hole in the bottom of the sea, starting on the sea bottom some thirteen thousand feet down, and drilling through another eighteen thousand feet of mud and rock to the Moho, would invent a series of wonderful robot diggers or a wonder-machine like the "Mole" which earned so many headlines a few years ago, and is revealed here as an industrial come-on that backfired. He would, of course, start from scratch, aided only by his knowledge of physics and mechanics.

Instead, the AMSOC committee turned to the people who are already doing these things, and discovered that a fabulous technology had evolved in this one industry that was ready to handle the Mohole problems as they came up, or could suggest practical ways of doing so.

This part of the book, though it is a minor one, is a revelation of what is left out of the usual visualization of the future in a science-fiction story. It is, for that matter, left out of most visualizations of our own society. The sophistication of an ordinary oil derrick is amazing. The problem of drilling an oil well—world's deepest, as of September, 1958, was 25,340 feet—is essentially like that of trying to apply pressure to the bottom of a wire one sixteenth of an inch in diameter and twelve stories long. Vicious vibrations develop: both compressional waves, and unpredictable "whips" with varying frequencies that race up and down the rotating pipe . . . but in offshore drilling, this very whip may

help offset the "Magnus force" that is a counterpart of the force that makes baseball curves or launches hurricanes.

You will see that drilling technology—especially offshore drilling—is international. The advances in turbo-drilling, which may have to be brought into use on the Mohole, have been made in France and Russia since World War II, because those nations needed speed in their industrial comeback. Germany is contributing the cycloidal propellers that may help hold a drilling ship still over the Mohole in spite of currents and bad weather—or it may be done with the gigantic Harbormaster outboard motors that were used in an ingenious way on the CUSS I, the ship that was used successfully to drill the test hole off the Mexican coast, after the events of the book closed. You'll learn, on the lighter side, what use was found for a San Diego trolley wheel at Eniwetok in 1952.

Above all, I hope, you'll gain a much needed respect for the technology—practical, hard-working relative of science—that often turns out to have solved problems that the scientists didn't even know were in existence. You'll see the deep necessity for cross-fertilization among the sciences, and between science and engineering, that is blocked by scientific compartmentalization and the insistence on internal security.

Stone Age man had technological skills—certain forms of flint chipping—that we cannot successfully duplicate today with the tools he had available. Physicists, studying the frac-

tured stone, can reason out how the job might have been done, but they can't pick up a piece of flint and do it. That was a muscular skill, learned early and perfected through long practice every time a knife or a scraper or a spear point was needed. The flint knapper of the Upper Paleolithic or Neolithic *could* do it, just about every time, with materials of varying properties. He had no science, but his technology was advanced.

In our time, every industry has its technological secrets, evolved by trial and error or discovered through a process of "mutation" in a flash of intuition by some machinist or foreman. "A Hole in the Bottom of the Sea" shows technology coming to the rescue of "pure" sciences—oceanography and geology. How about some more technology in science fiction?

» » »

STAR SURGEON, by Alan E. Nourse. David McKay, Inc., New York. 1960. 182 pp. \$2.95

This, I'm sorry to say, I overlooked when it came out. *Amazing* published it as a one-shot novel in the December, 1959 issue; McKay has published this slightly expanded version as a teenage yarn.

Alan Nourse's Dal Timgar, though just out of school, joins two distinguished members of the science-fictional medical profession as active in Deep Space—"Rene Lafayette's" Ol' Doc Methusaleh, and Murray Leinster's Calhoun of the landing-grid worlds. "Star Surgeon" has the advantage of authenticity—its author is,

after all, an M.D.—but his rivals live in better stories.

Dal Timgar has a major handicap in his drive to become a Star Surgeon: he has gray fur. In other words, he is the first nonhuman to be admitted to the medical school of Hospital Earth, and Earth cherishes her monopoly of lucrative contracts to preserve the health of far-flung worlds. He makes it, needless to say, with the help of a classmate and an influential Earth physician, and over the opposition of another classmate and an even more powerful member of the medical brass. There are some interesting problems, and one stinker with a tricky twist in it, which is the big set-piece of the book.

I guess this does belong on a teenage level—as Alan Nourse's short stories definitely do not.

» » »

THE GREEN RAIN, by Paul Tabori. Pyramid Books, N.Y. No. G-624. 1961. 192 pp. 35¢

I suspect that readers are going to find this book dull, or stupid, or unreadable in about the degree that it treads on their own corns. There is nothing subtle about its message, but Paul Tabori is adept at just the suave, mocking, tongue-in-cheek approach that takes the edge off the preaching and puts it on the entertainment.

It seems that an attempt is to be made to seed the Moon with something called "chlorophylogen," which is supposed to provide that dead husk with an oxygen atmosphere and lush vegetation in record time. But the first

rocket flubs back into the atmosphere and seeds the Earth instead. Everyone caught out in the rains that follow shortly is turned green—and, *pace* Lamarck, the color breeds true through the female line.

Promptly, all the predictable issues pop up. Is a white man who has turned green still "really" white, or is he colored? Is a black man who is just as green as his erstwhile white boss still black, or the same as the boss? Are green people inherently better than other people—or worse—or what? Can non-green people be turned green by treatment with vitamins or radiation or beauty cream or elixirs? Can green people be changed back to what they were?

In the midst of it all, a couple of professional rabble rousers, inviridated simultaneously while on a speaking tour in India, find themselves out of work and forced to join forces. With the ruthless pragmatism of a pair of trained Communists, they take up the Green cause where the Red left off, move in on a green evangelist, replace her with a greener strip-tease artist, and deftly finagle that glamorous *creme de menthe frappé* into the—natch!—Green House.

While a variety of sub-plots struggle to work themselves out in the side rings, the drive to make the world Green heads straight for its goal. At last another C-rocket is to be sent up, and the atmosphere triggered to assure universal rain—green rain, that will bestow the ineffable boon of Greenness on everyone. Well, it goes up—but what happens is first cousin

to Ward Moore's "Greener Than You Think," or maybe the prelude to Murray Leinster's memorable old yarns about "The Mad Planet"—ours.

Have you ever had a nightmare in which you became one of "Them"? Then you won't like "The Green Rain." Are you outspokenly liberal—but? Leave it alone. Can you take a blunt needle—a regular tattooing with blunt needles and green ink—for the sake of some extremely enjoyable play with words, people, stereotypes and ideas? So, try—it's only thirty-five cents.

» » »

VOYAGE TO THE BOTTOM OF THE SEA, by Theodore Sturgeon. Pyramid Books No. G-622. 159 pp. 35¢

How Theodore Sturgeon, one of the finest writers science fiction has evolved, came to be writing a book based on somebody else's script for a science-fiction movie, only fandom knows. The film itself is due to open in New York in a week or so, as this is written, and the paperback has been out for some weeks.

The story itself is strictly Hollywood—which is not so far from synonymous with action-SF of fifteen or twenty years ago. I credit Sturgeon with having injected some reasonably lifelike characterization and motivation, especially in the later parts, but I may be doing an injustice to the producer-writer of the screen play, Irwin Allen.

At any rate, an atomic submarine is making a scientific reconnaissance of

the Arctic Ocean when the sky bursts into flame. Something is raising hob with the Van Allen belts, and burning up the world in the process. Admiral Harriman Nelson, owner of the sub, believes he can blow up the flame with a well-placed H-bomb. Experts summoned by the United Nations say this will only make things worse, and that the thing will fade away of its own accord. So Nelson and his crew go anyway, hunted by the fleets of the world, haunted by tensions, religious mania, and sabotage within the crew, and attacked by krakens rather than the sea serpent of the cover.

The book won't win Sturgeon any laurels, but without his ability it could have been terrible. Let's hope the film isn't.



PROLOGUE TO ANALOG, edited by John W. Campbell. Doubleday & Co., Garden City, N.Y. 1962. 212 pp. \$3.95

To dispel some argument, I'll admit that at this writing I have not yet seen what may turn out to be the most interesting part of this first ASF anthology in nearly ten years—namely, John Campbell's introduction. I am not, therefore, going to try to guess his reasons for choosing the nine stories he has—just tell you what he has chosen, and how they seem to fit into the seven years before *As-tounding* became *Analog*.

There have certainly been better stories in ASF during this period, but they have been "tapped" by other anthologies. This is one of the hazards that other magazines avoid with an-

nual or even more frequent collections. Still, they are meaty stories, all told. Only one—Roger Kuykendall's "We Didn't Do Nothing Wrong, Hardly" from May 1959—strikes me as pure entertainment. Its super teenagers simply do what comes naturally, and if the adult world is upset over the results, that's too bad.

These have been the "psi years" in ASF, but only two stories have psi themes, and both of them are "really" about something else—the same something else that is supposed to be the moving force in "serious" fiction. That is, they are about fundamental problems of human beings in a society where science is important. To put it even more simply, they are modern science fiction.

Take the oldest of the nine, Isaac Asimov's "Belief" from October 1953. Ostensibly it is about a man who discovers that he can levitate. Practically, it is about the reaction of orthodoxy against evidence it doesn't want to see, and what has to be done to break through the stasis. Or that psi comedy from November 1959, Rick Raphael's "A Filbert is a Nut"—on the surface, just another about a psychopath in an asylum, but on the next level up or down, a warning that the whole field of psi investigation may be booby-trapped with red herrings and misdirection, so that we don't yet know what we are trying to study.

I've said before that a good deal of the antagonism of "in" critics to science fiction and SF themes is that they simply don't recognize scientific problems as real. Randall Garrett and

Bob Silverberg collaborated in "Sound Decision"—October 1956, and I blame Randy for the punning title—which makes, a little overdramatically, the basic point that was handled more subtly by Tom Godwin in the classic "The Cold Equations." Intellectuals and liberals just cannot understand or accept this point: that scientific laws are absolute, and cannot be set aside by men of good will or suspended by democratic action. I felt the problem of Godwin's one blundering teen-age girl more deeply than those of the several not-very-likable sets of passengers in "Sound Decision." Maybe Godwin was too subtle and the lesson has to be rubbed in.

H. Beam Piper has already earned classic status with his "Omnilingual"—February 1957—which overturns a scientific axiom: that a message in an unknown language, written in an unknown script, can never be translated. Granted he has dealt himself a few high cards in this story of archeologists trying to get at the secrets of a long-dead Martian civilization—the point is that science, like mathematics, has its absolutes that pass unchanged through the translations of concept and language and even species. Incidentally, this applies even where the language is known. A friend just back from Yucatan tells me that they are teaching Maya in some of the schools in Merida . . . but all we've been able to translate of the ancient Maya writing is its astronomical tables and mathematics.

Piper being Piper, "Omnilingual"

also has a good, strong plot line and legitimate characterization. Christopher Anvil's novelette from September 1956, "Pandora's Planet," is also strong on plot. We Earth-born comen hopelessly tangle up a race of conquerors from outer space with our shenanigans—but there's also a sneaky little moral down there under the guffaws and fast action: progress comes when you have inspiration reacting against conservatism.

We're accused of not preaching—of having no social responsibility comparable to that of, say, Tennessee Williams' plays. Well, we preach. We can do it unsubtly, as in the Garrett-Silverberg story, or more subtly, as in some of those I've been describing, or come right out, as in J. F. Bone's "Triggerman"—December 1958—and say that we can't *trust* an infallible machine to press the red button that will start World War Third and Last. That same lesson is illustrated, though not rubbed in, in Joseph Martino's "Pushbutton War" from August 1960. This one has a sneak punch. The need for a human being to make decisions that a robot can't make is quite clear, but the author and reader share knowledge that Harry Lightfoot doesn't get—there's a parallel between the trained war-horses that his Apache forefathers rode, and the robot pilot that has been trained in other ways to carry him to war.

I repeat, these are not the best stories ASF printed between 1953 and 1960, but they illustrate the strength and variety of present-day science

fiction. Stories of this kind are much harder for the novice and the layman to appreciate than a yarn of straight, colorful action on a far planet or in a future society, where the only problem is whether the monster will get the girl before the hero does.

» » »

THE EDGE OF TOMORROW, by Howard Fast. Bantam Books No. A-2254. 120 pp. 35¢

Six of the seven short stories and novelettes in this collection are from our neighbor, *Fantasy and Science Fiction*, where this accomplished novelist seems to be enjoying himself immensely. The seventh is from the late *Fantastic Universe*.

Howard Fast made his mark first as one of the country's finest historical novelists, then followed the Moscow line in a series of angry novels about present-day social injustice. It was ironic that while Congress barred his books from overseas libraries, some of the strongest arguments ever written for the American ideal were kept out of the hands of our service men and our allies. Disillusioned, he has returned to historical fiction and has ventured into this new field, where he is enriching relatively familiar ideas with excellent writing.

"The First Men," by far the best of the group, offers a kind of corollary to Wilmar Shiras' "In Hiding"—except that Fast argues that the hidden superman will inevitably become the ordinary human being he imitates. A group of anthropologists

and teachers try to find the potential supermen as infants, and to create a society where they can grow as themselves. But the plan goes wrong, in all too familiar a way whose brutal irony is still effective, telegraphed though it is.

"The Large Ant," poorest of the lot, is not much more than an incident with implications. Large "ants" that are obviously extraterrestrials are found—but Man's innate savageness prevents him from dealing with them rationally.

"Of Time and Cats" is farce comedy: the man who is endlessly duplicated by a time machine. Incident and detail make it fun.

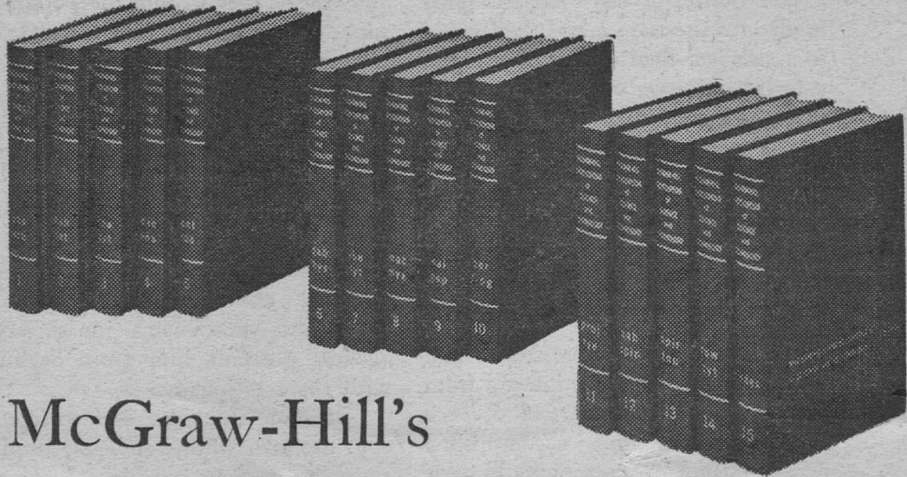
"Cato the Martian" is a satire on our own attitudes, and on the insanity of preventive war.

"The Cold, Cold Box" is a wry vignette about the hard-nosed tycoon who failed to realize that other people would be just as ruthless as he had been, given the motive and the means.

"The Martian Shop" is another variant on an old theme—unifying mankind against a common enemy. The details of how it is done are what make the story fascinating.

Finally, "The Sight of Eden" is another story about the shortcomings of mankind in the eyes of the universe.

Howard Fast is still preaching the sins of society, but in a subtler medium than he once used, and in a company experienced in its use. He is doing a good job; let's hope he keeps it up. ■



McGraw-Hill's

Time-Trap

BY JOHN W. CAMPBELL

The new McGraw-Hill Encyclopedia of Science and Technology is, for any consistent science-fiction reader, the darndest trap anyone's come up with yet. It's a sort of intellectual equivalent of the La Brea tar pits; if you once stray into it, you can't get out again. It takes anywhere from one to two hours to look up something you want in it.

For instance, I wanted to look up something about servo-motors the other evening. (I'm working on an automatic guidance setup for tracking stars with a telescope.) I started about ten.

By midnight, I hadn't finished looking up what I wanted, but I had found that:

1. There's one variety of tropical marine shrimp that's over two

feet long . . . and that ain't no shrimp!

2. You know that old one about . . . lesser fleas to bite 'em, and so on, *ad infinitum!*" — well, it seems there's a variety of mite — mesostigmata — that lives exclusively as a parasite in the ear of a variety of moth!
3. If it weren't for the unstable refraction effects of Earth's atmosphere, the present Palomar Mountain 200-inch telescope could show the disks of several stars other than our Sun!
4. The energy flux received at Earth's atmosphere from a star of apparent magnitude m is.

$$F(m) = 2.4 \times 10^{-5}$$

$$10^{-0.4m} \text{ ergs/cm}^2/\text{sec.}$$

so that a second magnitude star

yields about 3×10^6 ergs/cm²/sec.

5. A servo-motor system was not the proper approach to the problem I had in mind. A synchronous motor (see AC Motor, Synchro, Synchronous Motor) with a controlled variable-frequency AC supply is better.

But that fifth point I didn't get at until the next day. By which time I'd also learned about silviculture and spin, silver and skinks, actuators, actinium, Atlantic Ocean, and a variety of other things.

The Encyclopedia is a trap for anyone with the mental characteristics of a science-fiction reader — it's just what a man with the interested-in-any-scientific-information type of mind does want.

I wouldn't be in this science-fiction business if I weren't born curious; with the aid of you readers, I've been constantly alerted to new areas for investigation. (An eight-page essay on life forms living in a New Zealand hot spring, from a reader who lives nearby, and makes a hobby of observing them. Standard Pasteurizing temperatures run about 140°F.; he reports fish swimming around in water at 160°F.! Or a telephone call from a reader who reports, sadly, that his last vampire is dying on the table before him. And thereby bringing his research to a screeching halt. How does a vampire succeed in gnawing a hole in your forearm, sans anaesthetic, without your feeling it? Can ultrasonic screeches cause a local anaesthetic effect?

This McGraw-Hill Encyclopedia is a fourteen-volumes-plus-one-index volume collection of just that sort of thing.

They have maps of North America — but not the usual kind. They're geological-history maps. I live on the eastern slope of the first ridge of the Watchung Mountains in New Jersey. This was the first time I saw a good, clear indication of how, why and when this basaltic intrusion was formed.

Most technically trained men like to feel they have at least a general idea of what other technologies are about — and it isn't exactly easy to achieve that today. Too much happens too fast.

It's obvious, as a matter of fact, that this Encyclopedia is not a definitive work. Sure — it's been prepared by top men in every field discussed. Acknowledged authorities, Nobel Prize winners, or founders of the field. But the very nature of Science and Technology make a definitive work impossible — for a definitive work in any field is equivalent to an epitaph. "Rest In Peace" — the final stasis has set in.

Probably the ideal — somewhat impractical, unfortunately! — would be a loose-leaf encyclopedia, so that the old theories and "proven" certainties could be quietly removed, as new ones come along. The next best arrangement, McGraw-Hill has in operation — an annual Year Book, to up-date the more active fields, and add data on the major revisions in all fields. (Paleozoology isn't apt to

change much from year to year; the section on magnetohydrodynamics and hydrogen fusion will be totally revised within five years, obviously.)

The function of an Encyclopedia of this sort is unique, and cannot be matched by anything else. It's not like Isaac Asimov's *Encyclopedists* of his *Foundation* series stories, an effort to gather all human knowledge in one set of books — or all Science and Technology. That's the function of major libraries — the Library of Congress for instance.

There's a rather subtle hidden assumption built into any technical textbook — the assumption that the field of knowledge covered in this textbook is the field you want and need to know about. The author assumes that, and it's remarkably easy to get suckered into accepting that as a fact!

To illustrate what I mean: Suppose there is the problem of devising some system by which the family pooch can let himself into the house, other than, and more efficient than the traditional method of barking until someone responds and opens the door.

An electronics engineer will have a powerful tendency to assume that the technical information he has is necessary and sufficient to solve the problem. Presently, with photocell, light-source, amplifier, relay, and motor he has an electronically operated dog-door opener.

A mechanical engineer will solve the problem with levers, cams, gears, and pulleys.

The general-duty handy man will

probably use a pressure-switch from an old refrigerator door, a solenoid from a discarded washing machine, and train the dog to move fast. The "systems engineering" approach — consider all the components of the problem, including the adaptability of the higher mammalia.

One of the critically important functions a good Encyclopedia of Science and Technology can serve is that general handy man approach — the men who built this Encyclopedia didn't assume that any particular field contained the information you need to solve your problem — so they give you a chance to browse through all, and select from them.

What's the best way to remove old, dried bloodstains from a cotton dress? Detergents? Solvents? Sometimes the answer to a relatively simple problem isn't in the "obvious" area. Use an enzyme — commercial meat-tenderizer is a protein lysing enzyme, and reduces the blood to a water-soluble material without injuring the cellulosic fibres of the cotton.

The McGraw-Hill Encyclopedia doesn't contain that item — but it *does* contain all the relevant articles to reach that conclusion — and contains them in brief enough, generalized form so that it is possible to get some understanding of many possibly-useful fields.

This is the factor that a complete technical library, *by reason of its completeness*, can't do for you.

And, of course, any good encyclopedia is a sort of mail-order catalog. The usual mail-order catalog gives a

description of the item being offered, with enough data to understand its general characteristics, offers a choice between different but comparable items, and winds up with an order number and price. A good encyclopedia describes the field under discussion, compares relevant areas by suggesting cross-references, and winds up with a bibliography. If you really want the goods on this field, order the full-scale detailed textbook.

There are some gorgeous color photographs, some I'd never seen before, and in my position I tend to see a fair variety. There are some color shots of the Andromeda galaxy, the Orion nebula, and others that are darned near worth the price of admission by themselves. (That star-tracker I'm trying to build is not going to be equivalent to the Palomar Mountain 48-inch Schmidt Camera . . . but I can look at Palomar's results, anyway.)

Aside from that, there's one item I have found, so far, that the Encyclopedia doesn't cover — and I tried a few on the "Hm-m-m . . . let's see if—" basis. They don't have any-

thing on the Sterling engine, or the Sterling Cycle. Sterling silver is listed in the Index . . . but no Sterling engine. (It's a heat-engine that does *not* work on the Carnot cycle, and is theoretically capable of efficiency nearly twice the theoretical maximum of a Carnot cycle engine.)

If you want to have a happy Christmas, give this to some member of your family, so you can read it. It's especially suitable for Christmas, because there are enough holidays so the time-trap effect can be worn off somewhat before you have to get back to work.

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Brass Tacks

Dear John:

Will you pass my comments on to Mrs. (or Miss?) Gerhart who commented on Utopia in your June issue?

Utopias, like heavens, being products of the human imagination, reflect a great deal more of the social condition of their inventors than anything else. You, Mr. Campbell, in advocating a plutocracy indicate that you feel that money-making is a goal that brings out the best abilities in a man—you sound a bit like a man who is sure he can do this himself and that it proves your worth. Actually, plutocracy has been tried a number of times; it doesn't work very well. Venice tried it in the middle ages, so did Burgundy and various Northern city-states. Trouble is, one of the first things such a plutocracy does is to pass laws that make it easy to hang on to money, hard to make a fortune; it becomes a closed aristocracy, always very unstable since it traps able peo-

ple at the bottom. If you made rules barring the inheritance of money, it might work—but that's the kind of law the possessors of wealth would be most unlikely to pass, as one of the chief advantages of money has always been the hopes it will give one's children a head start in life.

As to Miss Gerhart's Utopia: Seems to have been derived from an admittedly idealized version of American society in somewhat more pioneer days, probably the period between the Revolution and the Civil War; this was the period of the rise of Unitarianism and such experiments as Brook Farm. You can get by very nicely with no "leaders" if: (a) your population is small or at least scattered; (b) the culture is sufficiently homogenous so that all conflicts remain strictly interpersonal and there are recognized methods for dealing with them, and (c) (this is very important) there is a safety cushion in the form of excess territory or other modes of earning a living that is available to drain off

the misfits, the losers in the interpersonal conflicts of (b).

This has been, taken broadly, the social pattern of Europe since Neolithic times. The main safety valves have been: (1) New territory. This was available in Europe itself right through medieval times, since up to about the fourteenth or fifteenth century there was still plenty of undeveloped land. (2) Armed bands of predatory humans; the Viking raiders, the Crusaders, Robin Hood, the Conquistadores, the "gangs" (we think of them as urban, but cf. Jesse James or Ma Barker's boys). (3) Cities and the urban manufacturing complex. In many respects America is more conservative and has maintained this complex longer.

You get a rural "Utopia" all right—but it is stagnant, slow, stupid, conservative, and backward. Of course, a Utopia is by definition stagnant (where are you going? You're already *there*); in your comparison with a hydra you indicated how little adapted they are to compete directly with more complex organized systems. But—don't underestimate the survival value of a hydra. After so many million years, there are still plenty of hydras about. The individual hydra may be helpless in competition with other "higher" organisms, but very often the higher organism itself is dependent on the hydra for a food supply, and must maintain at least a breeding stock.

Which brings me to another criticism of Miss Gerhart's Utopia. Nonviolence and reverence for life

—sounds great. But remember, animals are by their very nature predatory (we don't grow our own chlorophyll, do we?) so it comes down to, whose life shall we have reverence for? All species? But the lion has very little reverence for the life of the lamb, who in turn has little reverence for the life of the grass. And if you decide, the hell with the lion, I'm a lamb man myself; I'm for animals against vegetables, but I'm for the hunted against the hunter, you run into problems, too. Cutting down the predators on a deer population, for example, leads to an excess population of diseased, half-starved deer, utterly lacking in the grace, speed, and beauty that makes a deer so memorable. Very inferior deer, in fact. If I were a deer, I might well prefer to take my chances with a puma. India might form an instructive human parallel. Death comes once to a customer, anyway, among metazoans, and no amount of "reverence for life" can do more than alter the when and the how, never the whether.

Well, you can say, then cut down the birth rate—either by abstinence and late marriages, or by chemical or mechanical means. But voluntary birth control, whatever the means chosen, can't have more than a temporary effect; because some people aren't going to pay any attention to your propaganda and *their* children are going to inherit the earth—population problems and all. Government interference then? Can you imagine having to ask some social worker's permission to have kids?

She'd be a female Hitler in no time, practicing pre-natal genocide. And are you and I going to accept that we are not worth reproducing? Not without a struggle, that's for sure. You might try dropping oral contraceptives in the drinking water—but *everybody* would have to do it, or the same applies—and passing out licenses and a special diet to those selected to reproduce. There'd be a lively traffic in bootlegged water and special diets, but at least it would be eugenic in the sense that the more enterprising would be the survivors.

But—what's an "ideal population size"? Hunters and gatherers no doubt would think all agricultural countries grossly overcrowded—Daniel Boone and the Indians agree on this one. If you grew up in a semirural area, you are likely to find this ideal; as soon as you make some money in the wicked city you will move to the suburbs and settle down in a dwarfed version of a New England farmhouse or a Western ranchhouse, with a little symbolic miniature farm and pasture around it. But, since it is not functionally a farm, you are apt to pine for the old virtues of freedom and independence that growing your own food gave you, the lack of dependency on a complex social organization (this life-long dependency probably accounts in part for modern "anxiety" problems and much suppressed hostility). You or your ancestors left the rural Utopia, partly because there was no room for you in it, but partly also because in actual fact you found it pretty intolerable;

monotonous, intolerant of the new and different—it's Utopia, it fights change—lacking in opportunity, mental stimulation, and even real kindness. There was plenty of neighborliness—but there was plenty of pretty vicious gossip, too; it retained the necessary homogeneity by a permanently sitting court of public opinion. The "puritanism" that Miss Gerhart objects to is the product of just this kind of society; Judaism—at least modern Judaism—and Unitarianism are both city products.

As to the "emotionally unfit," the "psychotic"—who are to be banished. Just what are your criteria to be? Does everyone have to be completely "normal"—utter conformity? Or how eccentric will you be allowed to be? Well, take the central ideal of nonviolence and reverence for life—make psychotic everyone who doesn't subscribe to this value; this is the sort of way almost any society arrives at its definition of psychotic.

Well, then, you outlaw murder. It's *been* outlawed, for the last thousand or so years, with very indifferent success. You can always get around it by hit-and-run tactics, by the accident that isn't really an accident—well, read the crime and detective stories. Or if you do succeed in internalizing nonviolence, and the pressures get high enough, people will sooner or later start blowing their corks; in Malaya it is called "running amok," but we have the same thing here—a too meek, too peaceful individual will suddenly

drop all his over-tight control and start killing indiscriminately. You can call him psychotic if you like and lock him up, but the damage is already done; if you lock him up before he kills, it puts too much power in the hands of the psychiatrist, who is human, too. As to other violence—almost anything can be used in a hostile way, if you feel hostile; Ghandi's non-co-operation was far from friendly. "I bring you, not peace, but a sword."

The trouble with Utopias is that they look at one side of the coin only; and in a real world there are always at least two sides and an edge. Personally I don't think the semirural society is any more of a Utopia than a city; the problems and limitations are of course *different*, but the noble son of the soil is a peculiarly narrow and rather self-stultifying myth, like the myth of the noble mother. I won't go along with Philip Wylie and curse mom unconditionally, nor will I curse the farmer; I just say that neither of them is any more intrinsically worthwhile as a human being than anyone else.—Charlotte Olmsted.

1. *I didn't propose a Plutocracy; votes were to go to EARNED income only. Let 'em inherit wealth! They lose the vote that way!*

2. *Ideal birth control: an oral contraceptive, effective for about thirty days, to be taken about twice a week, cheap as cigarettes, and about equally habit-forming. This makes it automatically self-reminding, so it isn't accidentally forgotten. And it is then also auto-*

matically selective; only those who can maintain a fixed determination, against habit inclination, for thirty days or more, get to reproduce. Also hot-tempered people who get mad and take on "to show him (or her)" don't have hot-tempered children. Birth control should be a matter of free choice—let the actual character of the parents determine, not some self-appointed authority.

» » »

Dear Mr. Campbell:

Until reading the letter of A. L. Overton in the August issue of *Analog*, I was unaware of any controversy as to the identity of Mark Phillips. Now, however, I wish to add a little extra information to the argument.

I recently came across a paperback titled "Esper"—or, in the hard-cover edition, "Jack of Eagles"—and written by James Blish. In this book, the hero, Danny Caiden, is confronted with a band of psionic brigands led by a man with a familiar name, Sir Lewis Carter. Several years after this book was published, *Analog* came out with the Kenneth Malone serials. In the last one of these, Kenneth Malone becomes a member of a psionic group with the same name as the earlier group. This naturally leads to questions.

Has Sir Lewis changed his colours and become a good guy? If not, is Kenneth Malone embroiled in malevolent activities? What is to be done about this? Will clarification

follow? In general, what is coming off here? And is Mark Phillips James Blish?

Comments?—Richard Bready, 698 Gladstone Avenue, Baltimore 10, Maryland.

Sir Lewis must be a badly misunderstood man, or maybe two other people of the same name.

» » »

Dear Mr. Campbell:

Before I write at length on your editorial-article, I thought I'd make a quick comment upon a letter by a Mr. L. F. Frank concerning my story, "The Untouchable." Sounds like a cute idea, but I wonder. According to testimony in the story, only the lowest plane of atoms in the device can be touched. Therefore, even if the switch were on the bottom, it couldn't be thrown. The horizontal component of the switch would be penetratable; as a matter of fact only the ultimate tip of the switch would be material! And, even if you could get sufficient friction on the tip to throw it, how would you hold the box?

But that's a digression. The primary purpose of the letter is to comment on "Pie in the Sky."

BRAVO!!!!

Several valid points. First of all, you were quite correct in the psychology of the American people—although there seems to be a bit of a shift, not much, due to the successful MR3 shot of LCDR Shepard. A poll of the need for a space program re-

cently showed that 58% of the people were against it, and that the remainder was divided between the undecideds and the pros.

Secondly: Assuming that the Rabinow report of the Dean Device is valid and that the device is not a space drive; even so, it is a crying shame that nobody investigated it for as long a period of time as it took. When you are behind in a race you ought to try every way of winning, and the additional effort it would have taken to examine the thing would have been minimal with the potential return.

Thirdly: While the United States Government was caught completely flatfooted and shocked (page 88), *they had no right to be*. In the IAF congress months before the launching of *Sputnik I*, Leonid Sedov gave figures of mass, orbit, and measurements that the vehicle would produce. *Missiles and Rockets* published the data, also months in advance. Many of us were just waiting for the axe to drop, but nobody would listen to us.

Fourthly, I noticed a few weeks before *Sputnik* went up a national weekly news magazine was carrying an article on the Space Race, which was a re-re-rehash of *Vanguard* press releases, with a pious little paragraph on the bottom, saying (roughly) "The Soviet Union has announced that they, too, will launch orbital vehicles during the IGY."

I wrote them, asking them the whys and wherefores; in particular, why they downgraded the announced

Soviet effort—Sedov had made his announcement long since—as they were going to put a far heavier mass in orbit, et cetera, et cetera, and the reply I got was a honey: “As we have covered some of this in other issues of the magazine, we did not think it would interest our readers to repeat it.”

On your point of the Solids vs. Liquids: I can't quite agree. There are places for both. The Agena vehicle demonstrates a good place for the employment of liquids: in a vehicle that must be restarted—be this an upper satellite stage or a megapound spaceship.

For similar reasons, I think that development ought to continue on the F-1 engine and Saturn. However:

In the case of primary boosters, certainly there is a place for solid-fuel rockets; they can form upper stages, too, on deep-space missions of the sort that can be thoroughly pre-programmed.

Alternate booster ideas ought to be investigated, too, including hydrogen balloons, ramjets, et cetera, because there remains a lot of room for improvement in this area.

Now: we did make some psychological progress since the MR3 shot. President Kennedy has decided that we ought to reach the moon before Russia, and he's getting additional

funds to do it. This is at least a step in the right direction, because for whatever the motivations, people are beginning to want to see this country first in space, which is healthy.

On liquid-fuel rockets, the problem is to try to figure a way to cut down the fantastic number of components. The Atlas is a fairly reliable missile, but it should not be thought of specifically as an ICBM—even if it is so listed. Our ICBM's are being developed; these are of the Minuteman type. The Atlas is just a misplaced research vehicle booster that has been impressed into service for the wrong job.

At that, it's obviously an upper-stage.

On advertising: YES! Much as I loathe the stuff, I think that this is just what is needed to put this back into perspective.

Hm-m-m: now let's see: Farside went out two kilometers . . . that ought to be about 55% of escape velocity—or over 77% of orbital velocity attainable. Now with an additional stage and a big polyetheleyne balloon . . . we can electrolyze water for hydrogen . . .

What's Analog's advertising budget, anyway?—Stephen A. Kallis, Jr.

*“Analog's advertising budget . . .”
Hub? What's that? Never heard of one around here . . .*

.....

MULTIPLE CHOICE ANSWER:

Number 3, of course—and it's the only well-known star that cannot be seen on any night during the entire year.

« *Continued from page 82* »
us to love. This can never be. Only Commander Y'Nor will leave the ship at Vogar, there to select his own Occupation force, while the men now among us continue directly on to the Alkorian war from which many of them will never return.

We must not resent the fact that on this, their last day among us, these men are forbidden to speak to us or to let us speak to them nor say that this is unfair when Commander Y'Nor's Occupation troops will be permitted to associate freely with us. These things are beyond our power to change. We must accept the inevitable and show only by our silent conduct the love we have for these warriors whom we shall never see again.

Kane gulped convulsively, read it again, and hurried back to Larue's office.

"How long has that last edict been up?" he demanded.

"About twelve hours."

"Then every shift has seen it?"

"Ah . . . yes. Why—is something wrong with it?"

"That depends on the viewpoint. I want them removed at once. And tell that sanctified old weasel that if this last edict of his gets me hanged, which it probably will, I'll see to it that he gets the same medicine."

He went back into the plant and made his way through the bare-legged, soft-eyed girls, looking for Dalon. He overheard a guard say in low, bitter tones to another: ". . . Maybe eight hours on Vogar, and we

can't leave the ship, then on to the battle front for us while Y'Nor and his home guard favorites come back here and pick out their harems—"

He found Dalon and said to him, "Watch your men. They're resentful. Some of them might even desert—and Y'Nor wasn't joking about that gallows for us last night."

"I know." Dalon ran his finger around the collar that seemed to be getting increasingly tighter for him. "I've warned them that the Occupation troops would get them in the end."

He found Graver at a dial-covered panel. The brown-eyed secretary—her eyes now darker and more appealing than ever—was just leaving, a notebook in her hand.

"Since when," Kane asked, "has it been customary for technicians to need the assistance of secretaries to read a dial?"

"But, sir, she is a very good technician, herself. Her paper work is now done and she was helping me trace a circuit that was fluctuating."

Kane peered suspiciously into Graver's expressionless face.

"Are you sure it was a circuit that was doing the fluctuating?"

"Yes, sir."

"Did you know that half of Dalon's guards seem to be ready to jump ship?"

"Yes, sir. But their resentment is not characteristic of my technicians."

He realized, with surprise, that that was true. And Graver, in contrast to Dalon's agitation, had the calm, pur-

poseful air of a man who had pondered deeply upon an unpleasant future and had taken steps to prevent it.

"I have no desire to hang, sir, and I have convinced my men that it would be suicide for part of them to desert. I shall do my best to convince Dalon's guards of the same thing."

He went back through the plant, much of his confidence restored, and back to the ship.

Y'Nor was pacing the floor again, his impatience keying him to a mood more vile than ever.

"This ship will leave at exactly twenty-three fifteen, Vogar time," Y'Nor said. "Any man not on it then will be regraded as a deserter and executed as such when I return with the Occupation force."

He stopped his pacing to stare at Kane with the ominous anticipation of a spider surveying a captured fly.

"Although I can operate this ship with a minimum of two crewmen, I shall expect you to make certain that every man is on board."

Kane went back out of the ship, his confidence shaken again, and back to the plant.

Night came at last and, finally, the first shielded tank of fuel was delivered to the ship. Others followed, one by one, as the hours went by.

It was almost morning when Graver came to him and said, "My duties and those of my men are finished here, sir. Shall we go to prepare the ship for flight?"

"Yes—get busy at it," Kane an-

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swered. "Don't give the commander any excuse to get any madder than he already is."

An hour later the last of the fuel went into the last tank and was hauled away. Someone said, "That's all," and a switch clicked. A machine rumbled off into silence, followed by others. Control panels went dark. Within a minute there was not a machine running, not a panel lighted.

Dalon's whistle for Guard Assembly sounded, high and shrill. A girl's voice called to one of the guards: "Hurry back to your ship, Billy—the thunder hawks might get you if you stayed—" and broke on a sob. Another girl said, "Hush, Julia—it's not his fault."

He went out of the plant, and past Larue's office. He saw that the brown-

eyed secretary was gone, her desk clean. Larue was still there, looking very tired. He did not go in. The fuel had been produced, he would never see Larue again.

He took the path that led toward town. Part of the Whirlpool star cluster was still above the horizon, a white blaze of a thousand suns, and the eastern sky was lightening with the first rays of dawn. A dozen girls were ahead of him, their voices a low murmur as they hurried back toward town. There was an undertone of tension, all the former gaiety gone. The brief week of make-believe was over and the next Vogarians to come would truly be their enemy.

He came to the hilltop where he had met the mountain girl, thought of her with irrational longing, and suddenly she was there before him.

The pistol was again in her belt.

"You came with all the stealth of a plains ox," she said. "I could have shot you a dozen times over."

"Are we already at war?" he asked.

"We Saints have to let you Vogarians kill some of us, first—our penalty for being ethical."

"Listen to me," he said. "We tried to fight the inevitable in the Lost Islands. When the sun went down that day, half of us were dead and the rest prisoners."

"And you rose from prisoner to officer because you were too selfish to keep fighting for what was right."

"I saw them bury the ones who insisted on doing that."

"And you want us to meekly bow down, here?"

"I have no interest of any kind in this world—I'll never see it again—but I know from experience what will happen to you and your people if you try to fight. I don't want that to happen. Do you think that because a man isn't a blind chauvinist, he has to be a soulless monster?"

"No," she said in a suddenly small voice. "But I had hoped . . . we were talking that day of the mountains beyond the Emerald Plain and a frontier to last for centuries . . . it was just idle talk but I thought maybe that when the showdown came you would be on our side, after all."

She drew a deep breath that came a little raggedly and said with a lightness that was too forced:

"You don't mind if I have a silly sentimental fondness for my world, do you? It's the only world I have. Maybe you would understand if you could see the Azure Mountains in the spring . . . but you never will, will you? Because you lied when you said you weren't my enemy and now I know you are and I"—the lightness faltered and broke—"am yours . . . and the next time we meet one will have to kill the other."

She turned away, and vanished among the trees like a shadow.

He was unaware of the passage of time as he stood there on the hill that was silent with her going and remembered the day he had met her and the way the song swans had been calling. When he looked up at the sky, it was bright gold in the east and the blazing stars of the Whirlpool were fading into invisibility. He

looked to the west, where the road wound its long way out of the valley, and he thought he could see her trudging up it, tiny and distant. He looked at his watch and saw he had just time enough to reach the ship before it left.

Brenn was standing by his gate, watching the dawn flame into incandescence and looking more frail and helpless than ever. The cruiser towered beyond, blotting out half the dawn sky like a sinister omen. A faint, deep hum was coming from it as the drive went into the preliminary phase that preceded take-off.

"You have only seconds left to reach the ship," Brenn said. "You have already tarried almost too long."

"You're looking at a fool," he answered, "who is going to tarry in the Azure Mountains and beyond the Emerald Plain for a hundred days. Then the Occupation men will kill him."

There was no surprise on Brenn's face but it seemed to Kane that the old man smiled in his beard. For the second time since he was sixteen, Kane heard someone speak to him with gentle understanding:

"Although you have not been of much help to my plans, your intentions were good. I was sure that in the end this would be your decision. I am well pleased with you, my son."

A whine came from the ship and the boarding ramp flicked up like a disappearing tongue. The black opening of the air lock seemed to wink,

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then was solid, featureless metal as the doors slid shut.

"*Bon voyage*, Y'Nor!" Kane said. "We'll be waiting for you with our bows and arrows."

"There is no one on the ship but Y'Nor," Brenn said. "Graver saw to it that the Ready lights were all going on the command room control board, then he and all the others followed my . . . suggestion."

Kane remembered Graver's calmness and his statement concerning his men: ". . . It would be suicide for part of them to desert."

For *part* of them. But if every last one deserted—

The drives of the ship roared as Y'Nor pushed a control button and the ship lifted slowly. The roaring faltered and died as Y'Nor pushed

another button which called for a crewman who was not there. The ship dropped back with a ponderous thud, careened, and fell with a force that shook the ground. It made no further sound or movement.

He stared at the silent, impotent ship, finding it hard to realize that there would be no hundred-day limit for him; that the new world, the boundless frontier—and Barbara—would be his for as long as he lived.

"Poor Commander Y'Nor," Brenn said. "The air lock is now under the ship and we shall have to dig a tunnel to rescue him."

"Don't hurry about it," Kane advised. "Let him sweat in the dark for a few days with his desk wrapped around his neck. It will do him good."

"We are a kind and harmless race, we could never do anything like that."

"Kind? I believe you. But harmless? You made monkeys out of Vogar's choicest fighting men."

"Please do not use such an uncouth expression. I was only the humble instrument of a greater Power. I only . . . ah . . . encouraged the natural affection between man and maid, the love that God intended them to have."

"But did you practice your Golden Rule? You saw to it that fifty young men were forced to associate day after day with hundreds of almost-naked girls. Would you really have wanted the same thing done to you if you had been in their place?"

"Would I?" There was a gleam in the old eyes that did not seem to come from the brightness of the dawn. "I, too, was once young, my son—what do *you* think?" ■

The Analytical Laboratory

October 1961

PLACE	STORY	AUTHOR	POINTS
1.	Sense of Obligation (Pt. 2),	Harry Harrison	1.96
2.	The Asses of Balaam,	David Gordon	2.4
3.	Lion Loose,	James H. Schmitz	2.9
4.	The Man Who Played to Lose,	Larry M. Harris	3.65
5.	Love Me True,	Gordon Dickson	3.96

The Editor.

trary to the known and established Order of Things.

Anteaters are shy, nocturnal animals; if an anteater walks into the center of the village in broad daylight . . . that's as violently against anteater nature, at a behavioral level, as a levitating dog is against canine nature at an objective level. The natives, recognizing that behavioral-nature is as validly a part of the Order of Things as is objective nature, are just as much upset. The witch doctor must go to work at once to restore the natural Order of Things with proper charms and rituals.

While the explorer is contemplating the witch doctor's labors, he mops his brow, pulls out a cigarette, reaches in his pocket for his lighter . . . and fire springs into life at the end of his fingers.

This feat does impress the natives; this is an awe-inspiring supernatural ability. Ten-second photographs aren't; no native ever considered the question, and decided that (a) photographs couldn't exist, and (b) if they did exist it would require a long, elaborate, and difficult ritual to produce them, and (c) if they existed, and if they were produced, they could obviously be produced only by a young virgin wearing one silver necklace, carrying a gelatiné capsule filled with salt, and nothing else. Had the natives had such a fixed decision as to the impossibility of photographs, let alone fifteen-second photographs, they would have regarded the Polaroid picture with supernatural awe.

But the primitive tribes of the world *do* know about fire. They know, for one thing, that producing fire—the ability to generate it, not merely to maintain it—is the true test that distinguishes Men from Animals. Many tribes had the periodic ritual of allowing all fires in the tribe to go out—and then proving that they were still true Men, by rekindling fire. Kindling fire is difficult, it takes time and ritual and hard work. To kindle fire by a mere flick of the finger. . . ! *That is really* a supernatural power! They know for a positive fact that normal men can not do it.

Essentially, the "supernatural" is that which produces in its beholder the emotional turmoil of terror—the emotional turmoil of seeing Chaos, the Anarchy of Things and Laws, suddenly break through into the known and familiar Universe.

"Supernatural" is not an observed situation, pattern of actions, or thing; *it is an emotional reaction in the beholder.*

Like "Love," it is *not* a matter of objective facts, factors, and behavior patterns—it's a reaction in the beholder. Hence the age-old question. "What in the world does he see in *her*?"

In the case of the reaction, "Supernatural!", the emotion implied has an overtone—or undertone, if you will—of absolute terror. Let's distinguish between the concept "fear" and that of "terror" in this respect: a brave man is one who can advance in the

face of genuine fear. It doesn't take courage to advance to the attack on something you do not fear; courage is the attitude that allows a man to advance, knowing and realizing the risk of death and/or injury ahead.

"Terror" is something quite different; the claustrophobe is not *afraid* of small spaces; he's terrorized. Terror is an absolute—a trans-finite, overwhelming emotion. It's the emotional reaction to a conviction that you are faced with a threat that cannot be affected, deflected, or even moderated by any possible effort, and which will result in a destruction of inconceivable, unevaluable magnitude.

Some people are terrified of lightning; no amount of intellectual understanding of the nature of lightning, its behavior patterns, its low probability, et cetera, has the slightest effect. Those factors serve only to allow evaluation of the risk. But this is like talking about the risk in Russian roulette; after all, you have only one chance in six of blowing your brains out, so why do you say you won't play Russian roulette for any amount of money?

Because the *risk* may be only one in six—but the *threat* is absolute—infinite. And one sixth of infinity is still infinity. This makes the *gamble* completely unacceptable.

Someone for whom lightning poses a terror-threat is not eased by being shown odds of ten-million to one against being hit . . . or a billion to one. Because even one billionth times infinity is infinite.

Now a man lives in a world—a universe—which is, actually, his alone; he lives in his world-picture. A man's mind does not directly sense the world; it can't. It deduces the world from various data received through various data channels, and data-processing mechanisms. The world you live in is your world-picture—and all your sense of values must be based on that world-picture.

A man can sacrifice his life for just cause. (It may be unjust, in your estimation, but he holds it a just cause.) He can sacrifice his life in defense of his family, or instance.

He will, also, allow himself to be tortured to death, as a martyr, not because he chooses to, but because he finds himself psychologically incapable of ceasing the behavior that leads his torturers to destroy him.

In each instance, these things are undertaken, or accepted, because his world-picture is more important than his life—his world-picture somehow includes the proposition that the world he pictures can, and will, continue without his life being continued. He pictures his wife and children continuing, if he dies in their defense, and because of that world-picture he accepts the risk of death.

The martyr doesn't, ordinarily, do it quite so consciously; usually he'd frantically like to be able to renounce the behavior that's leading him to death . . . but the world-picture he has commands him against his will. A claustrophobe shoved into a closet, and assured he would be beaten to death with barbed wire if he came out

. . . would come out in a matter of seconds.

So . . . what could be a threat more horrible than the threat of painful death?

A threat of destruction of the world-picture itself.

The world-picture a man has, however, is simply his map of That Which Is Natural.

If he is convinced he knows-for-sure *all* the Laws of Nature, then, but only then, is the total of all things divided neatly into Natural and Supernatural. If he recognizes that he knows *some* of the Laws of Nature, then there are three divisions; the Natural, the Unknown, and the Supernatural—and that last is, in fact, the *Contranatural*. To one who recognizes that there are things of which he is ignorant, some not-known-to-be-Natural things are "super"-natural in that sense, but not in the terror-sense of the *Contranatural*.

Basically, the primitive tribesmen feel the terror of the Supernatural for precisely the same reasons the most advanced scientific logician does; either feels terror when his world-picture is invaded and blasted by the the *Contranatural*.

To the primitive, the ant eater in daylight is *Contranatural*, and the terror of the *Contranatural* arises. It's an awesome type of terror, for the *Contranatural*, by its very *contranature*, cannot possibly be fought, or overcome, by any Natural force. It's the fire that cannot be extinguished by withdrawing its fuel, for it burns without consuming. It's a **fire that**

leaps and glares from barren rock, without fuel, and without consuming and that cannot be extinguished by water, sand, or any Natural force. (Until an explorer comes along, sees it, lets out a yelp, runs for his radio, and calls in the oil company that hired him. In the explorer's world-picture, it's not *contranatural*; it's natural gas escaping from a split in the rocks.)

The supernatural is simply something that produces in *you* the fear that your world-picture may be shattered—and thus that the Absolute Terror that dwells in the *Contranatural* will be let loose upon you.

It can happen only when something that you *know* is absolutely impossible in Nature occurs. If it is something you have no opinions about—as the primitives have no opinions about Polaroid cameras—it is odd, interesting, strange. But not terrifying-*contranatural*. The cigarette-lighter rates "*contranatural*," because the primitives *know* fire can't be kindled that easily by any possible Natural force.

The present Normal Man, in our culture, regards the work of the true inventor as *Contranatural*. It's interesting to look at the characterization of Loki in the old Norse mythology. Loki was not exactly a god of Evil, or even an Evil god—but he was more or less a god of mischief. A highly untrustworthy character at best. Thor was big, bluff, hearty, and strictly the muscle man. Wotan was the Father;

wise, conservative, dependable. Loki . . . ?

Well, time and again, when the gods got into trouble, it was one of Loki's tricks that saved them. Loki was, in essence, that disturbing, trouble-making, unreliable—and, dammit, indispensable, for all you'd like to kill him!—individual, the ingenious innovator. He kept upsetting world-pictures, by throwing in new ideas, that changed the whole shape of things. Things that saved the day . . . but led to nightmares all night.

Loki represented a Supernatural—or Contranatural, more accurately—force among the Supernatural gods of the Norse! *He* was contranatural even in Norse gods' terms!

The routine-inventor, the gadgeteer, the inventor of slicker chrome plate, or faster computers, or other extender-of-what-we-already-know is a decent, proper member of Society.

It's the Galileos, who prove that the Earth is *not* the center of the Universe, and tear the whole world-picture to shattered remnants, that represents the Loki-type. They deal in the Contranatural. They show us that the mighty protecting walls of Sure Knowledge that surround and defend us . . . have holes in them, or are, actually, a painted backdrop in *this* area right *here*.

The terror courageous men feel in the face of the Contranatural is the most natural thing imaginable. The Contranatural, by definition, makes the Natural wither away, and leave us helpless . . .

The Contranatural, when we en-

counter it, forces us to *un*learn something we already know-for-sure.

Ordinary findings differ radically; they merely require that we learn something we didn't know before.

If Galileo had simply used his telescope to discover the hitherto unknown planets Uranus and Neptune, his work would have been received happily. Men would, at once, have started plotting the cycles and epicycles on which these newly discovered planets circled about the Earth. Astrologers would have happily set about correcting their horoscopes, achieving a higher standard of accuracy than ever before, now they were able to account for these thitherto undiscovered influences. No one would have had to unlearn a thing; all would have been comfortable.

What he did do was to shatter the total cosmology. The Earth itself suddenly shook itself, jumped, and started whirling madly through empty space, no longer supported by anything. The Sun, that beneficent little disk shining comfortably in the sky, suddenly exploded into an unimaginable monster of fire inconceivable. No longer a perfect shining disk, it was racked and torn, with great black holes visibly gnawing at it . . .

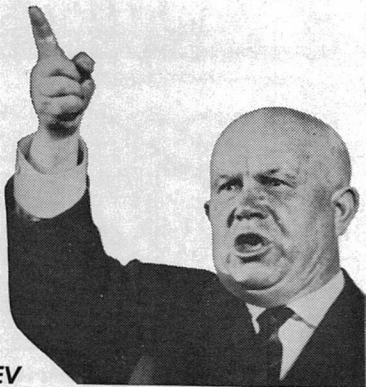
This is the ultimate terror; the terror of the Contranatural, when all the security a man has built, by learning how to work with reality collapses.

"It ain't all them things you don't know that hurts you; it's all them things you know that ain't so!"

That's where the terror of the Contranatural lives! ■

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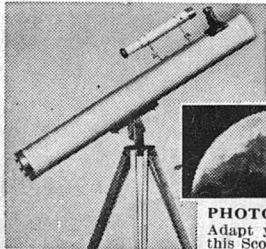
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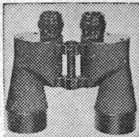
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