

Brains for Bricks

Malcolm Jameson

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Title: Brains for Bricks

Date of first publication: 1945

Author: Malcolm Jameson (1891-1945)

Date first posted: Apr. 24, 2022

Date last updated: Apr. 24, 2022

Faded Page eBook #20220460

This eBook was produced by: Al Haines

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[Source: Astounding Science Fiction, April 1945]

Brains for Bricks

by MALCOLM JAMESON

Given time enough, ants learn, even though, individually, they are almost brainless. They might—or a type like them might—rule a world, in time. But men have something worth while, too; brains have their advantages.

When next an Armadian ship came to Terra it was a gala day. This time it hove into sight escorted by a guard of honor; not harried and hounded by Terrestrial cruisers pecking futilely away at it out of their dread of the unknown. Now the world knew that the Armadian intentions were not hostile. They merely wanted that portion of the Solar System which Earthmen could not use themselves, and by way of recompense had sent an ambassador with a generous offer. If the Earth cruisers would quit attacking the Armadians engaged in mining the Red Spot on Jupiter and cede that planet and Saturn, the Terrestrials would be granted reciprocal rights in the Armadians' own bailiwick—the vast family of planets that swam about the sun Gol. It was this

successful envoy whom the latest Armadian ship had come to pick up.

Ellwood, chief of the Bureau of Interplanetary Military Intelligence, better known simply as the boss bimmy, watched the proceedings with interest. He saw how cleverly the incoming ship maneuvered itself alongside the grounded wreck of the ambassadorial vessel. For the first visitor was a partial wreck, having been fatally holed by a zealous cruiser captain unaware of the peaceful mission on which it was bent. And Ellwood watched how deftly the alien monsters managed the transfer of their imprisoned ambassador from his refuge in the as yet intact control room. Pholor, for that was the name finally given by him, was about to go, bearing with him the perpetual treaty of amity and commerce which he and Ellwood so laboriously had contrived to negotiate. And then, to the roar of saluting batteries and amongst a display of flags, the alien ship was off—to bear back to Armadia the strange news. Two races, each detestable monsters in the other's eyes, had found common ground.

Ellwood turned away. He disregarded the flow of oratory still coming from the temporary platform where the political bigwigs were holding forth. It was his own infinite patience and sympathetic understanding that had made communication with these outside creatures possible, but those qualities were essential to the proper doing of his job. He took no credit for them and expected none. After all, his role had been that of a mere interpreter. The ultimate decision had had to rest with the Council.

He strode off toward the laboratory building. Already the posters were up proclaiming the millennium was at hand. Shortly, thanks to the wisdom of the Powers That Be, new and fairer worlds would be open to settlement. Pioneering expeditions were in preparation. In a few brief years congested, tired old Mother Earth would see her chicks begin emigrating to far off Golia, where virgin planets were. No longer were the mysterious alien ships to be dreaded. No longer would conservationists have to worry about the approaching exhaustion of the last mineral deposits. No longer would the population-control men quail at the sight of the latest census figures. On New Eden, as the unseen promised planet was already being called, such problems would not exist.

Ellwood's mind was not on those by-products of his efforts. They were in the hands of others. He still had work to do right where he was. His gang knew that too, for Darnhurst was waiting for him in his office.

"All right, fella, hop to it," said Ellwood, sensing the unspoken question, and getting at once to the point. "Let the politicians spout. Our job is only half done. Round up your men and go on into that control room and find out what all the gadgets are for. Pholor gave us the ship for whatever we could learn from it."

"Dynamic or static study, chief?"

"Both—in that order. But I warn you. You'll have to take precautions. Working conditions in there are not nice. It's hot—a thousand Fahrenheit, about. It's filled with stinking,

poisonous gases at hellish pressures. And the grav plates are still putting out 3-Gs. You'll need to rig yourselves like I did or you'll pass out in nothing flat. But aside from that, the rest of it ought to be duck soup. Nothing was damaged in there."

"Yes, sir," grinned Darnhurst, and began punching call buttons on the order board.

After he left, Ellwood went down the hall to where Gonzales was working. As he passed the cadaver of the Armadian they had held back from dissection he paused a moment for a closer inspection of it. He was thankful that the Armadians appeared to have no respect for their dead, for Pholor had never intimated that he would like to carry away the bodies of the three killed by the hasty cruiser. This one would be an invaluable addition to the Bureau's museum.

As he regarded the sprawling remains of the—well, Thing—he could not fail to appreciate the horror the sight of it would inspire in the normal human being. There was no denying that the instinctive reaction would be revulsion. For it was grotesque, ugly—*incredible*. It lay there, an inert mass now, of armored sections from which sprouted strange appendages. It was as if some madman had dreamed up in a moment of a delirium a beast compounded in part of rhinoceri, octopuses, and armadillos, and ranged the segments in rows caterpillar fashion. For each plated segment rested on an elephantine monopod, and atop them were either nests of wide-ranging retractable tentacles, or else sets of weirdly shaped horns arranged as pentodes, triodes and diodes.

Ellwood wondered whether the psychomeds had made further progress while he had been engaged with Pholor. There were mysteries as yet unsolved. The Armadian was mouthless, eyeless, noseless, and earless. It had no alimentary tract. It subsisted on the vile mixture of ammonia-dominated air. It breathed through gills located beneath the segmental plates. It hunched itself around clumsily on its monopodial feet. It tended the intricate machinery of its ship with its many tentacles, each of which ended in some toollike terminal of horny growth. Some were capable of grasping, others cutting, punching, or exerting pressure. The body mechanics of the monsters, granting their queer metabolism, was fairly well understood. It was the nervous system that was baffling.

Perception came to an Armadian through his horns. Under their plates was a tangled mess of wire-like nerves, actuated by the radioactive salts abundant in their body fluids. Somehow they generated a queer sort of what can only be called organic radiation, similar to but different from ordinary radio waves or any other in the band of electromagnetic phenomena. They radiated those waves on a variety of frequencies from the antennae horns, and in turn interpreted their environment as they rebounded. Ellwood knew that much, and accepted it. What bothered him was that nowhere in the creature's structure was there anything analogous to a brain. There were only clotted ganglia arranged haphazardly throughout. Some were motor controlling, others sensorily interpretive. And there ended their capacity so far as any human knew.

Ellwood shrugged and walked on into Gonzales' room. His assistant was hunched over a microscope intent on something in its field while his fingers played incessantly on the buttons of a small testing box. Meter needles quivered as oscillating currents surged back and forth. But at Ellwood's footfall Gonzales sat back and flicked off the juice.

"What luck?" asked Ellwood.

"Still looking for a brain. They just haven't any, that's all. It's a screwy thing to say, but that is the way it is."

"Humph," frowned Ellwood. "It doesn't fit. They have memory, for they have been coming here at intervals for fifty years, and after the first visit confined their attentions to Jupiter, knowing the inner planets were unsuitable for them. They also remembered our many futile attacks on them. That is why they wanted to reach an understanding."

"That may be," shrugged Gonzales, "but now that you bring it up, how much memory does a young salmon have when she first goes to spawn? Yet she unerringly finds the proper place, though no fish is heavily endowed with thinking matter. No, I have examined this stuff over and over. There is no seat of reason. There are only reflexes. Highly intricate ones, yes, but reflexes."

Ellwood picked up a handful of the shredded stuff on the table. It was the remnants of an involved lump of nerve ganglia.

"Shoot amps enough into that," went on Gonzales, "and follow through, and it comes to life. In its essence it is a sort of radar. But it reports. It doesn't think. And it is the biggest and the most complicated of all the Armadian ganglia. Armadians do what they do like a bird builds her nest or a cobra spits venom—by a sort of super instinct. You needn't tell me that because they have space-spanning power ships jammed with crazy machinery that they have to be reasoning beings. I can't find any histological evidence to support the view. What they do is largely automatic."

"Nonsense," said Ellwood, a little testily, recalling the fine spirit displayed by Pholor. "They do reason, as was evidenced by Pholor's coming here at grave risk to himself. He wanted us to stop our senseless attacks on his ships, and at the same time realized we would expect some inducement. There you have not only memory, but foresight and logic. I even got a clear impression that the Armadians have what we call a sense of honor."

"The sense of honor," said Gonzales, dryly, "waits on the future to be proved. As to memory, foresight, and logic I merely suggest to you the well-known phenomenon known as symbiosis. Is the three-way partnership reputed to prevail among owls, prairie dogs and rattlesnakes the result of logically arrived at treaties? Or the relations between sharks and pilot fishes? Or those between ants and aphids? In their queer way these Armadians appreciate that we are no threat to them, though something of a bother. Who knows? Perhaps elsewhere in the galaxy they have experimented with co-operation and found that it pays better than strife. They

sensed the same possibilities here and reacted. To me it is no more mysterious than that."

"I don't know," said Ellwood slowly. "Pholor *showed* me—through his marvelous telepathic power—their high civilization, their immense heavy industries, their knowledge of atomics. I can't believe it is just instinct."

Gonzales laughed, for he saw the chief was shaken, despite his stand.

"Consider the lowly ant, boss. With lots less on the ball it has managed a pretty intricate social order too, and one that has lasted down through eons of perpetual adaptation by the rest of us so-called higher beings. Who are we to be scornful? Where are the dinosaurs today? Or Babylon, Rome, or a score of other perfected civilizations? The ant is a pragmatic creature. He found what worked, and stuck to it, dumbly if you please, but the ant endures. Yet we, vain with our sharp critical ability and ever itching to move on to loftier heights, tear down as fast as we build. If history means anything at all, it is that man is doomed by his own restless intellect to a succession of cycles. We go up, we go down, we get nowhere. That is what reasoning and your precious logic does for you."

It was Ellwood's turn to grin. Gonzales was a fellow with a philosophy all his own. This sort of thing could go on all afternoon. Ellwood was just about to break off and go when an annunciator began howling. Darnhurst was paging him.

"Yes, Darnhurst?"

"Better come down to the ship, chief. We've run into trouble in bunches."

Darnhurst did not exaggerate. Ellwood went, and he saw.

"No," he said, "this won't do. You've got to do it the hard way."

A hard way it was. One exasperating week of mankilling work followed another; the season waned and its successor came in before the bimmy gang satisfied its exacting chief that all had been learned about the Armadian spaceship. Where Darnhurst fell down in the beginning was in trying to ameliorate the conditions under which they must work. It proved to be impossible except for one detail. They found they could cut the artificial gravity down from 3-Gs to Earth normal. Every other effort at comfort failed.

The first had been the withdrawal of the noxious superheated Armadian gases and the substitution of air. At once hot metals that had never been exposed to the element before began oxidizing at an alarming rate. Unless oxygen was kept away there shortly would be no machines to study. So the ammonia-methane-phosgene combination went back in. Nor was it possible to reduce its temperature. It was discovered that the lubricants favored most by the Armadians were metals such as tin and lead. At temperatures tolerable to the bimmies these congealed and the machines froze. In like manner it was learned that pressures had to be maintained. Many of the Armadian valves were controlled by barystats

which operated as the pressures rose or fell about the mean, and that mean was high. When pressures were allowed to fall appreciably some of the stats began to swell, two of them bursting and spewing mercury vapor into the room.

Those were preliminary discoveries. Then a week after the beginning Darnhurst put in a hurry call for a dozen more men.

"Why so many?" asked Ellwood. "You have eight of our best."

"Chief," said Darnhurst wearily, "an Armadian is like an old-fashioned pipe-organ player. When he works on his instrument he uses everything he's got—both hands, both feet, both eyes and both ears. Well, that's the way these Armadian machines are set up. Those babies have twenty tentacles with an over-all spread of around forty feet and the one that used to operate that ammonia purifying gadget used every one of them all the time. It takes a lot of men scattered all over the ship to take his place."

"I see," said Ellwood, and O.K.'d the chit for the extra men. He also visited the ship the next day to see them in action. Darnhurst was putting the purifier through its paces.

"You, over there," he called through his helmet phone. "That thing you've got the jack against is a regulator for the methane flow just before it enters the mixer. When the monsters wanted less of the stuff they just got hold of it and squeezed, see? O.K., squeeze now while Jim and Freddie work those things across the room."

"I need a heavier jack," panted the man after a brief exertion. "Wow, what a grip those animals must have!"

The experience with the purifier was typical. The machine controls roamed like climbing vines all over the walls and overhead. The simplest operating adjustments often required simultaneous action at widely separated points. Mechanically speaking the vessel was a surrealistic dream.

But there came a day when the dynamic study was completed, and it was permissible to cool the ship off and drain the foul atmosphere. After that the relieved bimmies proceeded to dismantle the parts and examine them in detail. What they discovered amazed them.

"This is getting me down," said Darnhurst at one of the conferences. "The principles behind these machines are simply wonderful—far in advance of much of our own science. The material is marvelous—alloys that are tailormade. The workmanship—well, it's just beautiful. The stuff could be sold as jewelry. Yet the allover design stinks. There is no other word for it."

"That's what happens," drawled Gonzales, "when brainless creatures go in for invention. I keep telling you they think with their reflexes."

"We won't start that again," ruled Ellwood. "What we do next is redesign the whole show, and we'll do it in duplicate. One ship will be strictly up to Armadian specifications, but simplified. The other will be for our use, using the principles

we have discovered but substituting air for ammonia, and so on. Get going."

It took months more to build the two vessels. Ellwood immersed himself deeply in the collateral problems, turning all other routine over to assistants. From time to time rumors drifted to the lab of the hubbub in the world at large, but they made little impression. A new program had been formulated known as the Ten Year Plan, and all the industry of Earth was a beehive of activity. Space transports were being laid down on a colossal scale to be in readiness for the day when the waves of emigration would begin. Population control experts roamed the five continents selecting the favored ones who were to make up the first billion. The talk was all about New Eden and the paradise that was to be there. But Ellwood and his bimmy gang stuck to their knitting. It was an age of specialties, and they had their own row to hoe.

At last came the day when the two ships were ready for their trials. The human edition was a beauty, slicker and faster than anything known, and as handy as a bicycle. It embodied the best features of Armadian science and construction, coupled with the best of Terrestrial design. The Golian version was an equally good ship—for an Armadian—and the most startling feature of it was its apparent emptiness. The complicated controls had been reduced drastically and made largely automatic. Where twenty operations had been required before now only one was needed—a jab at a stud or the flick of a switch. Bulk had been cut to one quarter. There was now room for additional

auxiliaries that Ellwood assumed had been crowded out before. He had a few built and added.

It was well his work came to completion when it did. The day the ships' name plates were affixed there came an urgent message from the director general.

"How long will it take you to get out to New Eden?" he inquired anxiously over the telecom.

"A month I'd say. There are a lot of parsecs in between."

"You are leaving at once," said the director. "Take any ship you please, but get going. We are getting disturbing messages from the Relocation Committee out there."

"Trouble with the Armadians?"

"That's what I want to find out," snapped the director. "That fellow Crawford is too vague. All we know is that he keeps saying the Ten Year Plan is unworkable."

"I'm practically on my way," replied Ellwood, and snicked off the connection.

From afar the Golian System presented a gorgeous spectacle. About a blazing sun swam forty mighty planets and a number of lesser ones. Armadia was one, and Trusch, and Ukor, and Linh, the last two being ringed like Saturn. Great Trusch, four times the size of Jupiter, carried along with her a system of her own, a myriad of varicolored

satellites. And finally there was New Eden and the five other lesser orbs allotted to the men of Earth. They were bluish, and also had moons, those pertaining to New Eden numbering three.

Ellwood headed his new ship toward his planetfall, the *Golite*, its Armadian counterpart, trailing behind under remote control. Twice stubby nosed Armadian scout cruisers zipped by, looking him over, but except for the agreed upon exchange of recognition signals had nothing to say. And then Ellwood was spirally down into the clean atmosphere of fair New Eden.

He circled the planet twice in order to see it whole. It had not been misrepresented. It was well watered, but there were no vast wastes of ocean as the Pacific. Nor were there sprawling continents covering a hemisphere. It was an oceanic planet studded with many large islands, each with its rich lowland plains and its cool plateaus. There were rivers and lakes and islets galore, but no deserts, and the polar caps were small. Ellwood crossed the island known as Valhalla, and after that Paradise, flying low. He saw sky fields being prepared, and the tents of surveyors who were laying out the future cities. And then he was over New Eden proper, where the planetary capital was to be. He spotted the temporary barracks and the flagstaff that marked the place of administration, and landed in a field nearby after first guiding the *Golite* to its berth.

As he stepped out into the open he *knew* that this was heaven. The very first breath was exhilarating, and his quick step took on some of the characteristics of a prance. For

oddly, though the gravity was a trifle less than that on Earth, the oxygen content of the air was a little richer. The combination, together with the crisp, cool air, made him feel a new being altogether—at once strong and full of vigor, yet light and airy as a sprite. But his exuberation was soon to be dampened. In Crawford he found a dispirited man.

The executive chairman of the Relocation Committee wiped the gloom off his face only long enough to offer a perfunctory greeting, and then dejectedly waved Ellwood to chair.

"I'm told you're a whiz as a trouble shooter," said Crawford, glumly. "You'd have to be. We're getting nowhere fast here."

Ellwood waited, but Crawford was staring out the window.

"Don't the Armadians co-operate?"

"Oh, bother the Armadians," said Crawford, irritably. "How would I know? Yammer, yammer, yammer. Then they run away. Those codes you wrote into the treaty just don't work. Or something. Gibberish is what they send, and then they seem to get angry. We can't make 'em out, and the young fellows I send to Neutralia are afraid of them. We haven't a soul there now."

"Neutralia?"

"Yes—the medium-sized planet they set aside for our two legations. It isn't comfortable there for either one of us, but our envoys can live under domes and confer."

Ellwood felt a letdown. He was astonished that the code he and Pholor worked out had failed, so he pressed the point.

"Oh, some messages got through, though badly garbled," admitted Crawford, "but their demands are impossible. They say you promised commerce and they want to begin. But what demands! They can't use our lumber or plastics or textiles; they would go up in a puff in their temperatures. All they want is metals."

"Well?"

"It's the quantities," sighed Crawford. "They think in terms of millions. They offer a cubic mile or so of gold, or anything else they have lots of, but here's what they want in exchange ... lemme find the memo ... oh, half a million tons of tungsten, ditto indium, ditto uranium bricks, and so on. There just isn't that much stuff; not anywhere. And anyway, we're still in the pioneering stage here, which as you will see is bad enough without complicating it with the crazy demands of the Armadians."

Ellwood did not break the soggy silence that followed.

"The real trouble is at home," resumed Crawford, finally. "They have a bunch of dreamy optimists in charge and out of it comes the Ten Year Plan. I'm the guy that has to carry out this end of it. It's impossible, that's all."

"That word," said Ellwood, cheerfully, "is not familiar to me. In our labs we frown on it. I prefer 'tough' myself."

"Listen," snorted Crawford, "and then repeat that."

Elwood listened, unsympathetically at first, for he had sized up the man before him as a prime defeatist. But as Crawford dismally unfolded his tale Ellwood's respect for him rose. The fellow *was* holding the heavy end of the stick.

"The catch is," concluded Crawford, "that they want a perfect civilization set up before the first batch of colonists arrive. That entails plenty, because the emphasis is on the 'perfect.' There are to be no slums—ever. The cities are to be ready to move into when the immigrants arrive, which same goes for all the accessories—mining, agriculture, industry, transportation and research. All those facilities have to be exactly balanced as well. And my committee has to do it with what we've got without help from home, and be finished in time.

"Very well, so much for the program. The preliminary work is largely done, as I have an army of engineers to help me. But let's list the needs, and check off what we've done in this first two years.

"First of all we had to know what we had to work with, which means surveys. Our geodists have mapped the place and sounded the oceans. Our geologists have a picture of the subterranean for ten miles down, and I can tell you this planet has everything—coal, oil, metals, what you will, with reserves for centuries. The crop experts have planted experimental farms and know what to expect from the soil. The planet is fertile. The transportation sharks are doping out

the highway, seaway and skyway routes and have begun laying out terminals. Our astronomers—"

Crawford broke off and smiled a doleful smile.

"Say," he said wryly, "can you imagine having to dope out a strange solar system lousy with planets and moons and comets in less than two years? We haven't completed our first circuit of Gol yet, but they have a calendar. Or a tentative one. We also now possess what are laughingly called tide tables, but with three moons to contend with they are going to have to be revised."

"I think you have done remarkably well," commented Ellwood.

"So far, perhaps. It is the next step where the shoe pinches. Pretty soon we'll have to start construction, but what with? Cities to house a billion people call for a lot of bricks and steel, not to mention the heavy machinery for industry. I yell for material and the Council comes back and says I have everything here, use it."

"I see," grinned Ellwood. "Smelt your own ore and roll your own steel from what's here."

"Yes. But what do I sink the first shaft with, or drill the first oil well? They won't send me ore stamps or drill rigs because Earth industry is working two hundred percent capacity building spaceships. A billion people take a lot of transport even if you do spread 'em out over the last five years of the Plan. So they say it's my problem. I've got the

egg—produce the chicken. Wangle what you need from the Armadians."

Again he smiled wanly. "Except," he added, "it isn't as easy as that. To hatch your egg you have to set a hen on it."

It was a curious dilemma, and no fault of Crawford's. The authors of the Ten Year Plan had been over optimistic. If a billion persons and their baggage were to be shipped across the galaxy in the last five years of it, every ounce of Terrestrial production would have to be devoted to ship construction in the meantime. No help for New Eden could be expected from Earth. Yet for all its rich resources, the new planet was stymied for lack of machines. Once the ball of production was started rolling, trade was possible with nearby Armadia. Until then Crawford was in much the position of a hungry man on a raft laden with canned goods but without an opener.

"I think I'll take a run over to Neutralia and ask them to send for Pholor," announced Ellwood.

"You won't get far there," said Crawford, dismally. "The monsters seem to be sore about something. Anyway, what have you got to offer?"

"Brains," was Ellwood's cryptic response.

He parked his two ships beside the cluster of ambassadorial domes and waited for Pholor to come. In

those few days he had time to think the problem through. There were several ticklish aspects.

Ellwood shrewdly suspected that the reason the other envoys failed was due to their mutual distrust of types so alien. The human envoys insisted on using radio code for conversation, and the nature of the waves was such as to jar the delicate nerves of the heavy-world creatures. On the other hand, it was a good deal to expect of an ordinary man that he would willingly surrender his mind to the semihypnotic telepathic control of a beast as bizarre and repellant as an Armadian. Moreover, the compromise done in which they conferred was uncomfortable to both parties. Ellwood would leap that hurdle by going straight into the Armadian dome, for he had brought his special armor and heavy chair with him. He knew that thus shielded he could stand the Armadian environment, and he had already gone through the brain-searing ordeal of becoming neurally attuned to Pholor's mentality.

He was much less sure of his bargaining position. From one of the men who had attempted intercourse with the Armadian emissaries he learned a little of what was behind the present impasse. The ammonia breathers also had something analogous to the Ten Year Plan, and their ambitions far outreached their capacity to produce. They were in as big a hurry to develop Saturn and Jupiter as the Council was to colonize New Eden. Therefore it was imports of hard metals they wanted now in exchange for an equal tonnage of gold which was plentiful with them but of little use. Ellwood's informant also said he was given to understand that there was a good deal of dissatisfaction with

Pholor's treaty. Armadian hot-heads were declaring that it would have been better to exterminate the Terrestrians and have done with it, rather than pay for planets they could have had for the taking. To cede still others close to home was an outrage.

Besides this bad start, Ellwood was growingly aware of still another difficulty he was going to have to face. He had taken upon himself the task of talking Pholor out of the very thing he wanted—immense quantities of structural material and heavy machines—in exchange for nothing more tangible than ideas. He foresaw that the negotiations were likely to be tricky; a good salesman does not show all his hand at once. But in human intercourse a man is not compelled to reveal more than he chooses. In full psychic communion it was going to be hard to keep the hole card face down.

Ellwood devised a neural scanner, utilizing principles he had learned from the dissection of the dead Armadians. Then he pitted himself against it, setting up thought blocks and comparing them with the resultant records. The first results were disappointing. His efforts to hold back certain thoughts served only to emphasize them. But by the time Pholor arrived Ellwood had hit upon a system. He imagined in advance every conceivable question that might be put to him, and then thought out his answers. Those he keyed with appropriate cues, committed them to memory, and then deliberately trained himself to forget them. It called for the most strenuous mental effort, but in the end he felt relatively safe. Whatever he was to say was now buried deep in his subconscious mind, locked away until the appropriate question should recall it to the field of awareness.

Ellwood and Pholor met in the latter's embassy. The reunion was cordial enough, for the two disparate creatures had deep respect for each other, but Ellwood was quick to sense a new coldness. Pholor was not going to be as genially receptive as in their previous dealings.

"Observe," smiled Ellwood, easily, "the present I have brought you."

He directed Pholor's perceptions toward the little *Golite*, the bimmy designed ship for Armadian use. It lay within easy range of the Armadian's radarlike senses, and from where he sprawled on the dome floor he could examine it with his neural tentacles, fingering first one bit of Earth designed equipment and another. Ellwood followed his reactions with intense interest.

The initial response was quite different from what he was expecting. It was wholly negative. There was neither admiration nor delight, but a sort of baffled wonder. And then the wonder swiftly degenerated into a mixture of suspicion and distaste.

"What trick is this?" Pholor's sharp thought snapped over. "What controls these paltry toy machines? Except for a few buttons there is no place to lay a tentacle. What you have brought and call a present is a mockery. It is useless. It looks dangerous. Is this what you have to trade?"

It was like a dash of ice water. The superb design done by his experts was wholly lost on the stumpy, plated monster. Ellwood felt already that Pholor's mind was quitting the ship, having dismissed it as of no possible value. Desperately he summoned his most persuasive thoughts. He brought Pholor back mentally to the control room and went over each of the machines, explaining why the changes had been made. Why, in the interests of efficiency, they *had* to be made. Pholor remained unimpressed, but was finally persuaded to enter the ship.

The original Armadian design had been ridiculously complicated; the human version was a gem of compactness. One machine was the master barystat. It registered the prevailing gravitic influences and automatically adjusted every other machine. It maintained the inside gravity at 3-Gs, regardless of the nature of what was outside. It regulated the repulsors, so that they would develop just what power was needed to lift from any planet. It reported masses of all sizes in the vicinity and actuated the meteor deflectors. A single stud controlled it. It was either off or on. There was also a computer, which not only worked out from given coordinates the optimum trajectory between two points, but took care of deviations caused by stray bodies met in space. There were compressors and purifiers, all much simplified.

The control board was like none in human use. There were no dials, no name plates, no meters, no warning lights or buzzers. Armadians did not need them, being without sight or hearing. Through their curious means of perception they *knew* what current surged through a given circuit at a particular moment, and could appraise the fluctuating

magnetic and electric fields. On the *Golite's* panel there was a single master button that would turn everything on or off at once, and there was a single cutout for each auxiliary.

"Here," transmitted Ellwood, punching in co-ordinates on the computer, "I'm laying out a triangular course—we will circumnavigate Gol itself, angling off to come back in from behind Trusch. Once I set this it will take care of everything. Now I press the take-off button."

He felt Pholor's thoughts upon him, stolidly noncommittal. Then, as the ship soared away, there was a wave of distinct fear. Pholor was undergoing all the agonies of a backseat driver. Where normally his tentacles would be darting yards across the room to adjust this or tinker with that, there was nothing now to do. The automatics were doing it. The jangled tentacles twitched and coiled spasmodically. Pholor was not happy.

Then he grew calmer. At first it was a sort of resignation, but gradually he began to observe that the barystats, bolometers and other data takers were still feeding their machines and the machines were responding nicely to every trifling variation. Yet Ellwood had not touched the panel since the start-off.

"It works," came an awed thought from Pholor, a reluctant thought and one not fully believed in. "I can't understand it."

Ellwood tried to explain. Pholor tried hard to understand. Neither succeeded. They were already around Gol and on the second leg when Ellwood gave up in sheer exhaustion. He

laid back in his heavy chair and tried to conjure up another approach.

He knew by then that Gonzales was right. Armadians did not think. They reacted. The results of trial and error they could recognize, abstract principles befuddled them. Their science was strictly empirical; there was nothing analytical about it. Instinct, intuition, and blind groping explained their seeming culture. Automatic controls were beyond Pholor's comprehension. Where there is no capacity for logic there can be no concept of efficiency. Improvement to an Armadian meant building more and bigger models of what he had already found to work. Ellwood resolved to take a drastically different tack.

"Among my people," he sent, "when we find something that works but do not know why, we call it magic, and accept it. It is a very potent principle. This is a magic ship. Yet having it, you can remodel every ship you own. The savings in metal and the gain in space will be enormous. In exchange, we expect you to deliver to us one half the savings."

"Your magic is good," agreed Pholor after a time, "and I will take your present and be thankful. It will serve to placate those of my kind who are denouncing the treaty. But they will never consent to exporting the savings. We need every ton."

Ellwood was dismayed. He floundered for a moment and then came up with yet another idea. Spatial motive power was only one form of machinery.

"Take me on a mental tour again of all your industrial plants."

Pholor assented, and instantly Ellwood was launched again on a weird voyage to strange, big planets, traveling by proxy through the wide ranging perceptions of the other. As in a dream he inspected machines in mighty shops where the crushing drag of gravity would be fatal to a man in the flesh. What he saw confirmed his suppositions. All were as crudely designed as the stuff in the envoy's ship. Redesign would result in untold savings.

"Now show me your mines," asked Ellwood.

Here was a real surprise. Armadian mines were surface strip mines, and remarkably few in number. Ellwood was puzzled for a moment as to why planets larger in bulk than the sum of all Earth-controlled ones should have such meager ore supplies. And then he hit upon a double-barreled explanation. First, the large planet's heavy masses held back more of the lighter elements which the lesser planets tended to lose into space. Their surfaces therefore would run more to rock and less to iron. But the real key was in the Armadian mental habits. Not being a contemplative race they were not likely to ever develop a theory of geology. It would not occur to them that there were buried ore deposits, and had not looked for them.

"I have seen enough," announced Ellwood. "Let's get back to the dome."

Before he left he bore with him a codicil to the treaty. It gave all he asked and more.

"What luck?" asked Crawford, gloomily, as Ellwood strode into his office. There was no hope in his expression.

"It's in the bag," grinned Ellwood. "You'll get your stuff when and where you want it, delivered jobside. It'll be prefabricated, too."

"What! No, don't kid me. It's no joking matter."

"I mean it."

"All right." Crawford simply could not cheer up. "What's the catch?"

"What do *you* pay? Not too much. You assign me at once a couple of hundred of your smartest engineers and model makers, with shops and foundries to work in. I could use a geologist or so, too. I want our neocosmic radiant geoprobes rebuilt for Armadian use."

"I don't get it," said Crawford. "We can't send men onto Armadia and Trusch. They'd die."

"We aren't. We just send along their brain throbs. It is going to work this way—Armadia will shortly ship us specimens of all their machines. We redesign them and ship the models back. Blueprints and specifications won't do. They'd burn up. We will send them the geoprobes so they can

uncover subsurface deposits they never dreamed were there. And along with it we send samples of the girders and trusses and forges you want so they can get busy on manufacture."

"But," objected Crawford, "they insist on payment in metal. We haven't any."

"Oh, yes we have. Billions of potential tons of it in savings as they retool, not to speak of what is still in the ground. And it has already been delivered by me. We get back half."

"You're either delirious," said Crawford, staring at him, "or you've been pulling magic—"

"Magic," said Ellwood, grinning still wider, "is just what I used. I turned brains into bricks, and a fair swap is no robbery."

THE END.

[The end of *Brains for Bricks* by Malcolm Jameson]