BEFORE EDEN

by Arthur C. Clarke

"I guess," said Jerry Garfield, cutting the engines, "that this is the end of the line." With a gentle sigh, the underjets faded out; deprived of its air cushion, the scout car Rambling Wreck settled down upon the twisted rocks of the Hesperian Plateau. There was no way forward; neither on its jets nor its tractors could S.5 – to give the Wreck its official name – scale the escarpment that lay ahead. The South Pole of Venus was only thirty miles away, but it might have been on another planet. They would have to turn back, and retrace their four-hundred-mile journey through this nightmare landscape. The weather was fantastically clear, with visibility of almost a thousand yards. There was no need of radar to show the cliffs ahead; for once, the naked eye was good enough. The green auroral light, filtering down through clouds that had rolled unbroken for a million years, gave the scene an underwater appearance, and the way in which all distant objects blurred into the haze added to the impression. Sometimes it was easy to believe that they were driving across a shallow sea bed, and more than once Jerry had imagined that he had seen fish floating overhead. "Shall I call the ship, and say we're turning back?" he asked. "Not yet," said Dr. Hutchins. "I want to think." Jerry shot an appealing glance at the third member of the crew, but found no moral support there. Coleman was just as bad; although the two men argued furiously half the time, they were both scientists and therefore, in the opinion of a hard-headed engineer-navigator, not wholly responsible citizens. If Cole and Hutch had bright ideas about going forward, there was nothing he could do except register a protest. Hutchins was pacing back and forth in the tiny cabin, studying charts and instruments. Presently he swung the car's searchlight toward the cliffs, and began to examine them carefully with binoculars. Surely, thought Jerry, he doesn't expect me to drive up there! S.5 was a hover-track, not a mountain goat … Abruptly, Hutchins found something. He released his breath in a sudden explosive gasp, then turned to Coleman. "Look!" he said, his voice full of excitement. "Just to the left of that black mark! Tell me what you see." He handed over the glasses, and it was Coleman's turn to stare. "Well I'm damned," he said at length. "You were right. There are rivers on Venus. That's a dried-up waterfall."

"So you owe me one dinner at the Bel Gourmet when we get back to Cambridge. With champagne." "No need to remind me. Anyway, it's cheap at the price. But this still leaves your other theories strictly on the crackpot level." "Just a minute," interjected Jerry. "What's all this about rivers and waterfalls? Everyone knows they can't exist on Venus. It never gets cold enough on this steam bath of a planet for the clouds to condense." "Have you looked at the thermometer lately?" asked Hutchins with deceptive mildness. "I've been slightly too busy driving." "Then I've news for you. It's down to two hundred and thirty, and still falling. Don't forget – we're almost at the Pole, it's wintertime, and we're sixty thousand feet above the lowlands. All this adds up to a distinct nip in the air. If the temperature drops a few more degrees, we'll have rain. The water will be boiling, of course – but it will be water. And though George won't admit it yet, this puts Venus in a completely different light." "Why?" asked Jerry, though he had already guessed. "Where there's water, there may be life. We've been in too much of a hurry to assume that Venus is sterile, merely because the average temperature's over five hundred degrees. It's a lot colder here, and that's why I've been so anxious to get to the Pole. There are lakes up here in the highlands, and I want to look at them." "But boiling water!" protested Coleman. "Nothing could live in that!" "There are algae that manage it on Earth. And if we've learned one thing since we started exploring the planets, it's this: wherever life has the slightest chance of surviving, you'll find it. This is the

only chance it's ever had on Venus." "I wish we could test your theory. But you can see for yourself – we can't go up that cliff." "Perhaps not in the car. But it won't be too difficult to climb those rocks, even wearing thermosuits. All we need do is walk a few miles toward the Pole; according to the radar maps, it's fairly level once you're over the rim. We could manage in – oh, twelve hours at the most. Each of us has been out for longer than that, in much worse conditions." That was perfectly true. Protective clothing that had been designed to keep men alive in the Venusian lowlands would have an easy job here, where it was only a hundred degrees hotter than Death Valley in midsummer. "Well," said Coleman, "you know the regulations. You can't go by yourself, and someone has to stay here to keep contact with the ship. How do we settle it this time – chess or cards?" "Chess takes too long," said Hutchins, "especially when you two play it." He reached into the chart table and produced a well-worn pack. "Cut them, Jerry." "Ten of spades. Hope you can beat it, George."

"So do I. Damn – only five of clubs. Well, give my regards to the Venusians." Despite Hutchins' assurance, it was hard work climbing the escarpment. The slope was not too steep, but the weight of oxygen gear, refrigerated thermosuit, and scientific equipment came to more than a hundred pounds per man. The lower gravity – thirteen percent weaker than Earth's – gave a little help, but not much, as they toiled up screes, rested on ledges to regain breath, and then clambered on again through the submarine twilight. The emerald glow that washed around them was brighter than that of the full moon on Earth. A moon would have been wasted on Venus, Jerry told himself; it could never have been seen from the surface, there were no oceans for it to rule – and the incessant aurora was a far more constant source of light. They had climbed more than two thousand feet before the ground levelled out into a gentle slope, scarred here and there by channels that had clearly been cut by running water. After a little searching, they came across a gulley wide and deep enough to merit the name of river bed, and started to walk along it. "I've just thought of something," said Jerry after they had travelled a few hundred yards. "Suppose there's a storm up ahead of us? I don't feel like facing a tidal wave of boiling water." "If there's a storm," replied Hutchins a little impatiently, "we'll hear it. There'll be plenty of time to reach high ground." He was undoubtedly right, but Jerry felt no happier as they continued to climb the gently shelving watercourse. His uneasiness had been growing ever since they had passed over the brow of the cliff and had lost radio contact with the scout car. In this day and age, to be out of touch with one's fellow men was a unique and unsettling experience. It had never happened to Jerry before in all his life; even aboard the Morning Star , when they were a hundred million miles from Earth, he could always send a message to his family and get a reply back within minutes. But now, a few yards of rock had cut him off from the rest of mankind; if anything happened to them here, no one would ever know, unless some later expedition found their bodies. George would wait for the agreed number of hours; then he would head back to the ship – alone. I guess I'm not really the pioneering type, Jerry told himself. I like running complicated machines, and that's how I got involved in space flight. But I never stopped to think where it would lead, and now it's too late to change my mind … They had travelled perhaps three miles toward the Pole, following the meanders of the river bed, when Hutchins stopped to make observations and collect specimens. "Still getting colder!" he said. "The temperature's down to one hundred and ninety-nine. That's far and away the lowest ever recorded on Venus. I wish we could call George and let him know." Jerry tried all the wave bands; he even attempted to raise the ship – the unpredictable ups and downs of the planet's ionosphere sometimes made such long-distance reception possible – but there was not a whisper of a carrier wave above the roar and crackle of the Venusian thunderstorms. "This is even better," said Hutchins, and now there was real excitement in his voice. "The oxygen concentration's way up – fifteen parts in a million. It was only five back at the car, and down in the lowlands you can scarcely detect it." "But fifteen in a million! " protested Jerry. "Nothing

could breathe that!" "You've got hold of the wrong end of the stick," Hutchins explained. "Nothing does breathe it.

Something makes it. Where do you think Earth's oxygen comes from? It's all produced by life – by growing plants. Before there were plants on Earth, our atmosphere was just like this one – a mass of carbon dioxide and ammonia and methane. Then vegetation evolved, and slowly converted the atmosphere into something that animals could breathe." "I see," said Jerry, "and you think that the same process has just started here?" "It looks like it. Something not far from here is producing oxygen – and plant life is the simplest explanation." "And where there are plants," mused Jerry, "I suppose you'll have animals, sooner or later." "Yes," said Hutchins, packing his gear and starting up the gulley, "though it takes a few hundred million years. We may be too soon – but I hope not." "That's all very well," Jerry answered. "But suppose we meet something that doesn't like us? We've no weapons." Hutchins gave a snort of disgust. "And we don't need them. Have you stopped to think what we look like? Any animal would run a mile at the sight of us." There was some truth in that. The reflecting metal foil of their thermosuits covered them from head to foot like flexible, glittering armour. No insects had more elaborate antennas than those mounted on their helmets and back packs, and the wide lenses through which they stared out at the world looked like blank yet monstrous eyes. Yes, there were few animals on Earth that would stop to argue with such apparitions; but any Venusians might have different ideas. Jerry was still mulling this over when they came upon the lake. Even at that first glimpse, it made him think not of the life they were seeking, but of death. Like a black mirror, it lay amid fold of the hills; its far edge was hidden in the eternal mist, and ghostly columns of vapour swirled and danced upon its surface. All it needed, Jerry told himself, was Charon's ferry waiting to take them to the other side – or the Swan of Tuonela swimming majestically back and forth as it guarded the entrance to the Underworld … Yet for all this, it was a miracle – the first free water that men had ever found on Venus. Hutchins was already on his knees, almost in an attitude of prayer. But he was only collecting drops of the precious liquid to examine through his pocket microscope. "Anything there?" asked Jerry anxiously. Hutchins shook his head. "If there is, it's too small to see with this instrument. I'll tell you more when we're back at the ship." He sealed a test tube and placed it in his collecting bag, as tenderly as any prospector who had just found a nugget laced with gold. It might be – it probably was – nothing more than plain water. But it might also be a universe of unknown, living creatures on the first stage of their billion-year journey to intelligence. Hutchins had walked no more than a dozen yards along the edge of the lake when he stopped again, so suddenly that Garfield nearly collided with him.

"What's the matter?" Jerry asked. "Seen something?" "That dark patch of rock over there. I noticed it before we stopped at the lake." "What about it? It looks ordinary enough to me." " I think it's grown bigger." All his life, Jerry was to remember this moment. Somehow he never doubted Hutchins' statement; by this time he could believe anything, even that rocks could grow. The sense of isolation and mystery, the presence of that dark and brooding lake, the never-ceasing rumble of distant storms and the green flickering of the aurora – all these had done something to his mind, had prepared it to face the incredible. Yet he felt no fear; that would come later. He looked at the rock. It was about five hundred feet away, as far as he could estimate. In this dim, emerald light it was hard to judge distances or dimensions. The rock – or whatever it was – seemed to be a horizontal slab of almost black material, lying near the crest of a low ridge. There was a second, much smaller, patch of similar material near it; Jerry tried to measure and memorise the gap between them, so that he would have some yardstick to detect any change. Even when he saw that the gap was slowly shrinking, he still felt no alarm – only a puzzled excitement. Not until it had vanished completely, and he realised how his eyes had tricked him, did that awful feeling of helpless terror strike into his heart. Here were no growing or moving rocks.

What they were watching was a dark tide, a crawling carpet, sweeping slowly but inexorably toward them over the top of the ridge. The moment of sheer, unreasoning panic lasted, mercifully, no more than a few seconds. Garfield's first terror began to fade as soon as he recognised its cause. For that advancing tide had reminded him, all too vividly, of a story he had read many years ago about the army ants of the Amazon, and the way in which they destroyed everything in their path … But whatever this tide might be, it was moving too slowly to be a real danger, unless it cut off their line of retreat. Hutchins was staring at it intently through their only pair of binoculars; he was the biologist, and he was holding his ground. No point in making a fool of myself, thought Jerry, by running like a scalded cat, if it isn't necessary. "For heaven's sake," he said at last, when the moving carpet was only a hundred yards away and Hutchins had not uttered a word or stirred a muscle. "What is it?" Hutchins slowly unfroze, like a statue coming to life. "Sorry," he said. "I'd forgotten all about you. It's a plant, of course. At least, I suppose we'd better call it that." "But it's moving! " "Why should that surprise you? So do terrestrial plants. Ever seen speeded-up movies of ivy in action?" "That still stays in one place – it doesn't crawl all over the landscape."

"Then what about the plankton plants of the sea? They can swim when they have to." Jerry gave up; in any case, the approaching wonder had robbed him of words. He still thought of the thing as a carpet – a deep-pile one, ravelled into tassels at the edges. It varied in thickness as it moved; in some parts it was a mere film; in others, it heaped up to a depth of a foot or more. As it came closer and he could see its texture, Jerry was reminded of black velvet. He wondered what it felt like to the touch, then remembered that it would burn his fingers even if it did nothing else to them. He found himself thinking, in the light-headed nervous reaction that often follows a sudden shock: "If there are any Venusians, we'll never be able to shake hands with them. They'd burn us, and we'd give them frostbite." So far, the thing had shown no signs that it was aware of their presence. It had merely flowed forward like the mindless tide that it almost certainly was. Apart from the fact that it climbed over small obstacles, it might have been an advancing flood of water. And then, when it was only ten feet away, the velvet tide checked itself. On the right and the left, it still flowed forward; but dead ahead it slowed to a halt. "We're being encircled," said Jerry anxiously. "Better fall back, until we're sure it's harmless." To his relief, Hutchins stepped back at once. After a brief hesitation, the creature resumed its flow advance and the dent in its front line straightened out. Then Hutchins stepped forward again – and the thing slowly withdrew. Half a dozen times the biologist advanced, only to retreat again, and each time the living tide ebbed and flowed in synchronism with his movements. I never imagined, Jerry told himself, that I'd live to see a man waltzing with a plant … "Thermophobia," said Hutchins. "Purely automatic reaction. It doesn't like our heat." " Ourheat!" protested Jerry. "Why, we're living icicles by comparison." "Of course – but our suits aren't, and that's all it knows about." Stupid of me, thought Jerry. When you were snug and cool inside your thermosuit, it was easy to forget that the refrigeration unit on your back was pumping a blast of heat out into the surrounding air. No wonder the Venusian plant had shied away … "Let's see how it reacts to light," said Hutchins. He switched on his chest lamp, and the green auroral glow was instantly banished by the flood of pure white radiance. Until Man had come to this planet, no white light had ever shone upon the surface of Venus, even by day. As in the seas of Earth, there was only a green twilight, deepening slowly to utter darkness. The transformation was so stunning that neither man could check a cry of astonishment. Gone in a flash was the deep, sombre black of the thick-piled velvet carpet at their feet. Instead, as far as their lights carried, lay a blazing pattern of glorious, vivid reds, laced with streaks of gold. No Persian prince could ever have commanded so opulent a tapestry from his weavers, yet this was the accidental product of biological forces. Indeed, until they had switched on their floods, these superb colours had not even existed, and they would vanish once more

when the alien light of Earth ceased to conjure them into being. “Tikov was right,” murmured Hutchins. “I wish he could have known.”

“Right about what?” asked Jerry, though it seemed almost a sacrilege to speak in the presence of such loveliness. “Back in Russia, fifty years ago, he found that plants living in very cold climates tended to be blue and violet, while those from hot ones were red or orange. He predicted that the Martian vegetation would be violet, and said that if there were plants on Venus they’d be red. Well, he was right on both counts. But we can’t stand here all day – we’ve work to do.” “You’re sure it’s quite safe?” asked Jerry, some of his caution reasserting itself. “Absolutely – it can’t touch our suits even if it wants to. Anyway, it’s moving past us.” That was true. They could see now that the entire creature – if it was a single plant, and not a colony – covered a roughly circular area about a hundred yards across. It was sweeping over the ground, as the shadow of a cloud moves before the wind – and where it had rested, the rocks were pitted with innumerable tiny holes that might have been etched by acid. “Yes,” said Hutchins, when Jerry remarked about this. “That’s how some lichens feed; they secrete acids that dissolve rock. But no questions, please – not till we get back to the ship. I’ve several lifetimes’ work here, and a couple of hours to do it in.” This was botany on the run … The sensitive edge of the huge plant-thing could move with surprising speed when it tried to evade them. It was as if they were dealing with an animated flapjack, an acre in extent. There was no reaction – apart from the automatic avoidance of their exhaust heat – when Hutchins snipped samples or took probes. The creature flowed steadily onward over hills and valleys, guided by some strange vegetable instinct. Perhaps it was following some vein of mineral; the geologists could decide that, when they analysed the rock samples that Hutchins had collected both before and after the passage of the living tapestry. There was scarcely time to think or even to frame the countless questions that their discovery had raised. Presumably these creatures must be fairly common, for them to have found one so quickly. How did they reproduce? By shoots, spores, fission, or some other means? Where did they get their energy? What relatives, rivals, or parasites did they have? This could not be the only form of life on Venus – the very idea was absurd, for if you had one species, you must have thousands … Sheer hunger and fatigue forced them to a halt at last. The creature they were studying could eat its way around Venus – though Hutchins believed that it never went very far from the lake, as from time to time it approached the water and inserted a long, tubelike tendril into it – but the animals from Earth had to rest. It was a great relief to inflate the pressurised tent, climb in through the air lock, and strip off their thermosuits. For the first time, as they relaxed inside their tiny plastic hemisphere, the true wonder and importance of the discovery forced itself upon their minds. This world around them was no longer the same; Venus was no longer dead – it had joined Earth and Mars. For life called to life, across the gulfs of space. Everything that grew or moved upon the face of any planet was a portent, a promise that Man was not alone in this universe of blazing suns and swirling nebulae. If as yet he had found no companions with whom he could speak, that was only to be expected, for the light-years and the ages still stretched before him, waiting to be explored. Meanwhile, he must guard and cherish the life he found, whether it be upon Earth or Mars or Venus.

So Graham Hutchins, the happiest biologist in the solar system, told himself as he helped Garfield collect their refuse and seal it into a plastic disposal bag. When they deflated the tent and started on the homeward journey, there was no sign of the creature they had been examining. That was just as well; they might have been tempted to linger for more experiments, and already it was getting uncomfortably close to their deadline. No matter; in a few months they would be back with a team of assistants, far more adequately equipped and with the eyes of the world upon them. Evolution had laboured for a billion years to make this meeting possible; it could wait a little longer.

For a while nothing moved in the greenly glimmering, fog-bound landscape; it was deserted by man and crimson carpet alike. Then, flowing over the wind-carved hills, the creature reappeared. Or perhaps it was another of the same strange species; no one would ever know. It flowed past the little cairn of stones where Hutchins and Garfield had buried their wastes. And then it stopped. It was not puzzled, for it had no mind. But the chemical urges that drove it relentlessly over the polar plateau were crying: Here, here! Somewhere close at hand was the most precious of all the foods it needed – phosphorous, the element without which the spark of life could never ignite. It began to nuzzle the rocks, to ooze into the cracks and crannies, to scratch and scrabble with probing tendrils. Nothing that it did was beyond the capacity of any plant or tree on Earth – but it moved a thousand times more quickly, requiring only minutes to reach its goal and pierce through the plastic film. And then it feasted, on food more concentrated than any it had ever known. It absorbed the carbohydrates and the proteins and the phosphates, the nicotine from the cigarette ends, the cellulose from the paper cups and spoons. All these it broke down and assimilated into its strange body, without difficulty and without harm. Likewise it absorbed a whole microcosm of living creatures – the bacteria and viruses which, upon an older planet, had evolved into a thousand deadly strains. Though only a very few could survive in this heat and this atmosphere, they were sufficient. As the carpet crawled back to the lake, it carried contagion to all its world. Even as theMorning Star set its course for her distant home, Venus was dying. The films and photographs and specimens that Hutchins was carrying in triumph were more precious even than he knew. They were the only record that would ever exist of life's third attempt to gain a foothold in the solar system. Beneath the clouds of Venus, the story of Creation was ended.

The End