

# **Science Fiction**

## **Readings & Assignments: Week Three**

# Science Fiction

## Quiz: Week Three

1. In "Definitions," what does Adam Roberts mean when he characterizes SF as "technology fiction"?
2. In "Definitions," Quote one of the many definitions of "science" that Adam Roberts discusses.
3. "Dark They Were, and Golden-Eyed": What did Laura hear on the radio?
4. "The Second Night of Summer": Describe Grandma's animal friend.
5. "Born of Man and Woman": Why does the child-creature have trouble going up the stairs?
6. "Second Dawn": How does Eris cross the river?
7. "The Quest for Saint Aquin": What did the robass tell Thomas that he had a chance of becoming?
8. "Surface Tension": How many survivors are there?
9. "Crucifixus Etiam": What did Vogeli do that caused Manue to faint?
10. "The Nine Billion Names of God": What is the name of the project to find all the names of God in the universe?

# Science Fiction

## Journal: Week Three

1. “Dark They Were, and Golden-Eyed”: Why was the father the only one who cared about the strange things happening in their settlement? Is this a story about issues of assimilation versus acculturation? Explain.
2. “The Second Night of Summer”: How would the story be different if the hero were a strong, handsome young man instead of Grandma? Can it possibly be ethical to kill your own people to prevent an enemy from doing so? Explain. Do we have similar organizations who have people such as Grandma, who is an Interstellar Zone Agent?
3. “Born of Man and Woman”: Explain how this unpleasant and seemingly pointless story is intended to raise the spectre of hidden societal child abuse, especially that of children with special needs. If the story is about something else, explain that instead.
4. “Second Dawn”: Are mental and physical capabilities of equal importance? Why was it so difficult for Eris and Jeryl to accept a different way of life? Can you describe a historical parallel?
5. “The Quest for Saint Aquin”: If we stay on our current path and develop the type of advanced AI that the “robass” contains, and it adopted a firm belief or non-belief in transcendence, or God, would the masses become believers or non-believers accordingly?
6. “Surface Tension”: What was Lavon’s motivation to find the world outside his water puddle home? Was he disappointed or satisfied? Do the tablets the creators made hinder or help them populate and dominate the outside world like the creators intended them to? Explain how the story can be read as one about the insignificance of humanity.
7. “Crucifixus Etiam”: Manuel realizes how he is to play a small part in an 800-year-old engineering project to create a better world for future generations and he is able to find peace in that, while he was initially only drawn to Mars as all the others were: high wages. Is self-interest the only way we can fix problems or sacrifice for the sake of others? Sometimes, in other words, it is necessary to sacrifice the present to save the future. Can you describe a historical parallel?
8. “The Nine Billion Names of God”: The monks believe that once all the names of God have been written down that the world’s purpose will have been fulfilled. What do YOU believe is the world’s purpose? Remember, journal entries are to be 1-2 typed or 2-3 handwritten pages only!

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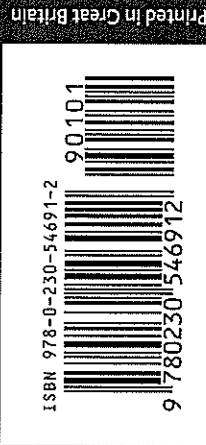
Adam Roberts has two careers. In one he is Professor of Nineteenth-Century Literature at Royal Holloway, University of London, UK, and has published a wide range of academic books and articles, including *Science Fiction* (2000). In the other he is a writer of science fiction novels, amongst them *Salt* (2000), *On* (2000), *Stone* (2000), *Polystorm* (2000), *The Snow* (2000) and *Gradisil* (2006). His most recent novels are *Splinter* (2007) and *Land of the Headless* (2007).

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# The History of Science Fiction

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First published in 2005

This paperback edition first published 2007 by

PALGRAVE MACMILLAN

Houndmills, Basingstoke, Hampshire RG21 6XS and

175 Fifth Avenue, New York, N.Y. 10010

Companies and representatives throughout the world.

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ISBN-13: 978-0-333-97022-5 hardback

ISBN-10: 0-333-97022-5 hardback

ISBN-13: 978-0-230-54691-2 paperback

ISBN-10: 0-230-54691-9 paperback

This book is printed on paper suitable for recycling and made from fully managed and sustained forest sources. Logging, pulping and manufacturing processes are expected to conform to the environmental regulations of the country of origin.

A catalogue record for this book is available from the British Library.

A catalogue record for this book is available from the Library of Congress.

10 9 8 7 6 5 4 3 2 1  
16 15 14 13 12 11 10 09 08 07

Printed and bound in Great Britain by  
Antony Rowe Ltd, Chippenham and Eastbourne

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# 1

## Definitions

### Three definitions

The obvious place to begin a Critical History of science fiction is with a definition of its topic, but this is no easy matter. Many critics have offered definitions of SF, and the resulting critical discourse is a divergent and contested field. One particularly influential approach is that of Darko Suvin (b. 1930), who calls SF

a literary genre or verbal construct whose necessary and sufficient conditions are the *presence and interaction of estrangement and cognition, and whose main device is an imaginative framework alternative to the author's empirical environment.* (Suvin, p. 37)

Suvin goes on, usefully, to isolate what he calls 'the novum' (plural: nova), the fictional device, artefact or premise that focuses the difference between the world the reader inhabits and the fictional world of the SF text. ~~This novum~~ might be something material, such as a spaceship, a time machine or a communications device; or it might be something conceptual, such as a new conception of gender or consciousness. Suvin's 'cognitive estrangement' balances radical alterity and a familiar sameness, such that 'by imagining strange worlds we come to see our own conditions of life in a new and potentially revolutionary perspective' (Parrinder, p. 4).

The critic and novelist Damien Broderick (b. 1944) has developed and refined Suvin's insights. He notes that the flowering of SF in the nineteenth and twentieth centuries reflected the great cultural, scientific and technological upheavals (he calls these 'epistemic changes') of that era, and pins down with more precise language the strategies employed by the bulk of SF texts:

SF is that species of storytelling native to a culture undergoing the epistemic changes implicated in the rise and supersession of technical-industrial modes of production, distribution, consumption and disposal. It is marked by (i) metaphorical strategies and metonymic tactics, (ii) the foregrounding of icons and interpretive schemata from a collectively constituted generic 'mega-text'

i.e. all previously published SF] and the concomitant de-emphasis of 'fine writing' and characterisation, and (iii) certain priorities more often found in scientific and postmodern texts than in literary models: specifically, attention to the object in preference to the subject. (Broderick, p. 155; my addition)

The writer and critic Samuel Delany (b. 1942) has, on the other hand, challenged the validity of defining SF in terms of its subject matter, and suggests instead that it is 'a vast play of codic conventions' which readers can apply to texts at the level of the sentence as much as the level of the text. He suggests that sentences such as 'her world exploded' or 'he turned on his left side' mean different things, depending on whether a reader approaches them as SF or ordinary fiction. He suggests: 'most of our specific SF expectations will be organized around the question: what in the portrayed world of the story, by statement or implication, must be different from ours in order for this sentence to be normally uttered?' (Delany, pp. 27-8, 31). For Delany, in other words, SF is as much a *reading strategy* as it is anything else.

Other critics who have attempted definitions (and there have been many) have explored different approaches. Brian Stableford (b. 1948), John Clute (b. 1940) and Peter Nicholls (b. 1939), in their lengthy entry 'Definitions of SF' in Clute and Nicholls' *Encyclopedia of Science Fiction* (2nd edn., 1993) quote sixteen separate definitions, from Hugo Gernsback's in 1926 ('a charming romance intermingled with scientific fact and prophetic vision') to Norman Spinrad's more recent 'science fiction is anything published as science fiction' (Clute and Nicholls, pp. 311-14). There is among all these thinkers no single consensus on what SF is, beyond agreement that it is a form of cultural discourse (primarily literary, but latterly increasingly cinematic, televisual, comic book and gaming) that involves a world-view differentiated in one way or another from the actual world in which its readers live. The degree of differentiation (the strangeness of the novum, to use Suvin's term) varies from text to text, but more often than not involves instances of technological hardware that have become, to a degree, reified with use: the spaceship, the alien, the robot, the time-machine, and so on. The *nature* of differentiation, however, remains debated, some critics defining science fiction as that branch of 'fantastic' or 'non-realist' fiction in which difference is located within a *materialist, scientific* discourse, whether or not the science invoked is strictly consonant with science as it is understood today. This means that faster-than-light travel (impossible, according to contemporary scientific orthodoxy) is a staple of science fiction, provided that such travel is rationalised within the text through some device or technology. A tale in which a character travels from Earth to Mars simply by 'wishing' or 'imagining' it might be defined as 'fantastic' or 'magic realist' rather than strictly science-fictional. On the other hand, few SF texts adhere with complete consistency to the scientific, or pseudo-scientific, logics of their conception. It would, for example, be perverse to deny that Edgar Rice Burroughs' *A Princess of Mars* (1912) is a work of science fiction, and yet the protagonist travels from the Earth to Mars precisely by 'wishing' the journey.

Some critics are comfortable defining as SF a range of texts more normally classified as magic realist or fantastic. In part there has been a reaction to the perceived

'gneticisation' of SF, by which the literary establishment in America and Europe dismisses texts by category, privileging so-called 'literary fiction' over so-called 'genre fiction' as if the category 'literary fiction' were anything other than a genre, and in many cases ranking 'science fiction' as especially juvenile and valueless, below 'historical fiction' and 'crime fiction' in their notional pecking order. This persistent prejudice does real harm by creating a climate in which it is harder for writers to work and gain recognition, thereby damaging literature in general. Polemic is probably out of place in a Critical History, so we can limit ourselves to observing how perniciously ridiculous these notions are, and (perhaps) humanely pitying the blinkered attitude of literary editors, reviewers and the intelligentsia literature that has been infected by them.<sup>1</sup>

This study has been unable to avoid the often tedious debates concerning 'definition': but my aim is to present an historically-determined narrative of the genre's evolution rather than offering an apophthegmatic version of the sentence 'SF is such-and-such'. This narrative is outlined in the chapters that follow, and it sees SF as a specific – and, as it happens, dominant – version of *fantastic* (rather than *realist*) literature: texts that adduce *qualia* that are not to be found in the real world in order to reflect certain effects back on that world. The specificity of this fantasy is determined by the cultural and historical circumstances of the genre's birth: the Protestant Reformation, and a cultural dialectic between 'Protestant' rationalist post-Copernican science on the one hand, and 'Catholic' theology, magic and mysticism, on the other. Those texts where the latter term predominates are often called 'Fantasy'; those largely or wholly within the aegis of the former are called 'Hard SF'. In between – the majority of texts with which we will have to deal – we find 'SF' as it is broadly conceived. But it is one of the theses of this study that pretty much all the classic texts of SF articulate this fundamentally religious dialectic. In asserting this I am not saying, as some critics have done, that SF embodies 'religious myth' or secularises religious themes. SF may, of course, do either or both of these things; but this is not my argument. My argument is that the genre as a whole still bears the imprint of the cultural crisis that gave it birth, and that this crisis happened to be a European religious one. This is, I think, worth stating unambiguously at the beginning of the study, so that the reader (who may well and profitably disagree with the emphases that follow) can position herself with respect to the argument. No critical history of science fiction could be wholly consensual, and nothing I argue here will please all, or perhaps even many, critics in the field.

The remainder of this chapter will be concerned with a more detailed discussion of some key terms in the definition of SF; specifically 'science' and 'technology'.

## The scientific

We need to define the term 'science' as it appears as a modifier in the phrase 'science fiction'. For some critics this is the crucial question when it comes to defining the genre. Brian Aldiss's influential argument that SF 'begins' in 1818 with Mary Shelley's *Frankenstein* (although Aldiss himself lists numerous important



ancestors) relies on the assumption that SF could not have originated any earlier than the nineteenth century precisely because it is only in the nineteenth century that 'science' as we now understand the term obtained widespread cultural currency. To quote Peter Nicholls: 'SF proper requires a consciousness of the scientific outlook ... a cognitive, scientific way of viewing the world did not emerge until the 17th century, and did not percolate into society at large until the 18th (partly) and the 19th (to a large extent)' (Clute and Nicholls, pp. 567–8).

'Science' as the term is generally understood means, roughly, a discipline which seeks to understand and explain the cosmos in materialist (rather than spiritual or supernatural) terms; a deductive, experimental discourse characterised by what the German philosopher Karl Popper (1902–1994) called 'falsifiability', whereby the accumulation of empirical data can disprove but never actively prove a theory. Because this version of 'science' is instrumental, it aligns the discourse closely to technology, specifically with the enormous technological advances associated with the Industrial Revolution. This sense of 'science' may explain why nineteenth- and twentieth-century SF is so much more fascinated with items of technology than it is with less 'applied' forms of scientific discourse (mathematics, biology, geography, chemistry, psychology, geology and the like) as such. Of course, there are examples of SF that take the term in this proper sense: Abbot's *Flatland* (1884), for instance, stands at the head of a vigorous little tradition of SF based on mathematical premises. But the great majority of SF written in the nineteenth and twentieth centuries is actually 'extrapolated technology fiction'. In an earlier critical study of science fiction (published by Routledge in 2000) I was quite persuaded by the argument that only a nineteenth-century 'scientific' cultural milieu could meld the constituent generic elements (fantastic voyage, utopia, future-tale, satire, and so on) into 'science fiction' as we understand it. I have since changed my mind. To put it simply, I no longer see why a distinctively modern conception of 'science' need underlie 'science fiction', given that 'science' more broadly conceived as a non-theological mode of understanding the natural world goes back a great deal further than the nineteenth century.

Of course, *something* happened to 'science' in the Victorian age. To be precise, with the nineteenth century's conception of science comes a cultural division into arts and sciences, a perceived separation between what C. P. Snow in his influential 1959 lectures called *The Two Cultures*. Stefan Collini, in an introduction to a recent reprint of Snow's study, points out that the term 'scientist' was first proposed in 1834 along the lines of 'artist':

the lack of a single term to describe 'students of the knowledge of the material world' had bothered meetings of the British Association for the Advancement of Science in the early 1830s, at one of which 'some ingenious gentleman proposed that, by analogy with artist, they might form scientist' (Snow, p. xii)

This is indicative of the sense, growing in culture through the mid-nineteenth century, that art and science form a binary; and with that there inevitably follows

'the economy of the binary':

Like all binaries art and science needed to be yoked together (yet held apart) in order to accrue the strengths of their polar positions: soft versus hard, intuitive versus analytical, inductive versus deductive, visual versus logical, random versus systematic ... two things seemed clear (in the mid-19th century): art occupied the domain of the creative, intervening mind, and the scientific ethos seemed to demand precisely the suppression of such impulses ... (Jones and Gallison, pp. 2–3)

The drift of modern mind, informed by this cultural tradition, defines 'science' in *opposition to 'art'*, such that science becomes inimical to aesthetics, a lamentable state of affairs for an art like SF which seeks precisely to explore the aesthetics of scientific premises. Taking SF out of the ghetto becomes part of the larger project of breaking down this pseudo-distinction. It seems natural to us; it is inscribed in our educational syllabuses from the earliest schooling and is reinforced by many aspects of culture. But we must bear in mind that it is a nineteenth-century cultural construction rather than a 'natural' state of affairs.

A much fuller sense of the possibilities of the genre is unlocked by taking science fiction back past the nineteenth century and exploring ways in which earlier notions of science informed fiction – to deconstruct, in other words, the logic of cultural binarism that wants to make 'science' and 'fiction' mutually exclusive terms. In fact, it can be asserted that science fiction itself, as a broad statement of aesthetic strategy, has always sought to resist the notion of 'the two cultures'. SF is the place where art and science connect. It is empirical proof that arts and science do not constitute a binary economy.

It helps, in working through the implications of this, to understand how notions of 'science' have shifted in the last century or so. Older theories of science assumed, in an unembarrassed way, that science provides systematic generalisations that explain the truth of the material world. For Bertrand Russell (1872–1970), for instance, scientific method involved a straightforward passage from observation to generalisation, although with 'a careful choice of significant facts on the one hand, and, on the other hand, various means of arriving at laws otherwise than by mere generalisation' (Russell, p. 3). That this definition depends on a rather arbitrary consensual sense of what distinguishes 'scientific generalisation' from 'mere generalisation' is one of its flaws. Another is the belief that data lead by accumulation to water-tight generalisations, or 'truths'. But this rather woolly sense of science was challenged by Popper.

Popper's insight was that science does not produce theories that 'explain' or 'determine' the world, because all scientific theorising is empirically contingent. Any theory can never be proved by observation, it can only be falsified. Observing a thousand two-legged penguins does not *prove* that penguins have two legs; on the other hand, observing a single three-legged penguin *falsifies* the theory. What follows from this is the notion that a scientific theory (for instance, 'that penguins have two legs') is not 'the truth', but rather a contingent explanation for the data

as they stand. We can think of this as the positivist definition of 'science'. The American philosopher Robert Nozick (1938–2002) neatly summarised this school of thought, which he called 'the standard model of science' in our post-Popperian culture, although he went on to challenge it on a number of grounds:

Karl Popper presents an appealing picture of science as formulating sharp theories that are open to empirical testing and to empirical refutation. Scientific theories are not induced from the data, but are imaginative creations designed to explain the data. (Nozick, *Invariances*, p. 103)

This notion of science as 'imaginative creation' is of the greatest interest to the critic and historian of SF, since SF is itself a more thoroughgoing mode of imaginative creation allied to science. One of the most appealing consequences of Popper's position is its unstated implication that SF is *a mode of doing science* (or 'philosophy' more generally conceived) as well as a mode of doing fiction. Not all philosophers of science would find this idea acceptable. Popper himself could see no place for imaginative creation, at least in the sense of 'the innovative, ingenious imaginative leap' that is the currency of SF, in his version of 'science':

The question of how it happens that a new idea occurs to a man—whether it is a musical theme, a dramatic conflict, or a scientific theory—may be of interest to empirical psychology; but it is irrelevant to the logical analysis of scientific knowledge. (Popper, *The Logic of Scientific Discovery*, p. 31)

One objection to the idea that SF might count as a genuine aspect of science as well as a branch of literature is that fiction, and other such cultural-artistic discourses (such as cinema, TV, the graphic novel and the like), operate according to aesthetic rather than logical-deductive processes. The force of this objection depends on a belief that the *process* of fiction, reading and writing, while occasionally deductive, is more frequently intuitive, metaphorical, metonymic, suggestive, psychological and imagistic. Even the hardest of Hard SF will partake of these 'soft' or aesthetic elements to some degree. But other philosophers of science have pointed out that it is a mistake to reduce 'scientific process' purely to logic. Ernest Nagel (1901–1985), for instance, stresses the importance of analogy to scientific practice: his example is 'the kinetic theory of gases' which is often theorised as if the particles acted 'like billiard balls' (Nagel, p. 110). For Nagel, analogies and hypotheses, while having obvious limitations, nevertheless 'can serve as fruitful instruments of systematic research' (p. 108). Similar modular thinking, whereby a model is constructed of a particular system, 'may be intrinsically valuable because it suggests ways of expanding the theory embedded within it' (p. 117). Many critics have seen SF as a modular system, with fictive 'worlds' modelling reality on a range of different levels, from the practical to the symbolic. Gwyneth Jones (b. 1952), SF author and critic, plausibly brings the whole of SF under the rubric of the experiment: 'the business of the [SF] writer is to set up equipment in a laboratory of the mind such that the "what if" in question is at once isolated and provided

with the nutrients it needs. This view of SF, she adds, 'is not new to science fiction writers and critics, but it is worth restating: the essence of SF is the experiment' (Jones, p. 4).

A fuller perspective on the role of science in SF can be obtained via the work of the American philosopher Paul Feyerabend (1924–1994). His book *Against Method* (1975) is a powerful polemic against 'method' in science. The best way to do science, says Feyerabend, is anarchically – 'anarchism, whilst perhaps not the most attractive *political* philosophy, is certainly excellent medicine for the *philosophy of science*', he says. Scientific rules limit possible advances in science: 'the only principle that does not inhibit progress is: *anything goes*'. Feyerabend proposes a free-for-all proliferation of scientific theories, even though some – or perhaps many – will be kooky, mystical, daft or unpalatable. However odd these theories get, Feyerabend is sure that in their interaction better and better models will emerge, better and better science will be practised. The alternative, he says, is to propose uniformity, a situation in which the powers-that-be manipulate consensus by force. This is rather close to the situation that presently obtains in science: scientists that advocate telepathy, alien abduction, the power of crystals and the like are frozen out of the scientific community by a mix of ridicule, cold-shouldering and the financial penalties of being unable to raise funds to pursue their research. Increasingly, the only way to obtain funding is to work within the accepted frameworks. Feyerabend argues that a 'proliferation of theories is beneficial for science, while uniformity impairs its critical power. Uniformity also endangers the free development of the individual' (Feyerabend, p. 5). So, for example, conventional science was not apprised of the environmental dangers of technological advance; awareness of such issues was raised by groups outside science: 'Green' political advocates, New Age enthusiasts and cranks of all sorts. And yet such figures have been vital in broadening useful debate on global warming, the environmental impact of technology, carbon economy; all things that 'science' now takes seriously. Feyerabend says:

Non-scientific procedures cannot be pushed aside by argument. To say: 'the procedure you used is non-scientific, therefore we cannot trust your results and cannot give you money for research' assumes that 'science' is successful and that it is successful because it uses uniform procedures. The first part of this assertion is not true, if by 'science' we mean things done by scientists – there are lots of failures also. The second part – that successes are due to uniform procedures – is not true because there are no such procedures. Scientists are like architects who build buildings of different sizes and different shapes and who can be judged only after the event, ie after they have finished their structure. It may stand up, it may fall down, nobody knows. (Feyerabend, p. 2)

*Against Method* is a polemic rather than a manifesto for change in science, and it is perhaps hard to see how his ideas might be put into practice (grant-awarding bodies, after all, do need *some* criteria to determine who gets research money and who doesn't, there being many more applications than money to fund them). And yet

it is the case that there does exist a space where the sort of 'science' Feyerabend is proposing already takes place; where brilliantly unorthodox thinkers bounce ideas around regardless of how strange they seem at first; in which experiments are conducted and blue-sky research undertaken. This space is called science fiction. Although he makes no mention of literature, Feyerabend's perspective includes, implicitly, the notion that SF is a crucial component of science as well as of culture. Research councils may rarely give money for the study of interstellar colonisation, time travel, extrasensory perception, mutant cactuses or virtual reality; but publishers *will* give money if the 'research' (which is to say, the novelisation) is good enough. Stephen Hawking's *A Brief History of Time: from the Big Bang to Black Holes* (1988) is a dull historical account of things that have already happened in science and some cautious speculation about things for which Hawking lacks empirical data. On the other hand, Will McCarthy's novel *The Collapsium* (2000) is a riveting account of how science might be, or will be, or ought to be. McCarthy imagines black holes not as highly compressed stars, but as very heavy elementary particles. His protagonist manages to assemble these particles into the material after which the novel is named, and from that wonderful Feyerabendian scientific experiment all sorts of fascinating things follow, including but not limited to plausible faster-than-light travel.

A Feyerabendian sense of the genre 'science fiction' would be alive to the fluid possibilities of the genre in a way that the (still widespread) older notion of science as a discourse with a special relationship to 'the truth' does not. To return to Russell's 1931 book on *The Scientific Outlook* for a moment. After elaborating the many advantages of a scientific outlook, Russell moves on to propose 'scientific world government' as a radical solution to the ills of the day. This government, he says, 'will embrace all eminent men of science except a few wrong-headed and anarchical cranks' (Russell, p. 193) (a qualification which speaks to the essentially conformist and coercive nature of 'scientific discourse' as Russell understands it). This scientific government, he continues,

will possess the sole up-to-date armaments, and will be the repository of all new secrets in the art of war. There will, therefore, be no more war, since resistance by the unscientific will be doomed to obvious failure. The society of experts will control propaganda and education. It will teach loyalty to the world government, and make nationalism high treason. The government, being an oligarchy, will instil submissiveness into the great bulk of the population, confining initiative and the habit of command to its members. (Russell, p. 193)

This distinctly unappealing picture is, although Russell does not say so, science fiction. It owes much to H. G. Wells, and looks forward to Aldous Huxley's *Brave New World*, which was published the following year ('a life of easygoing and frivolous pleasure may be provided for the manual workers ...', Russell, p. 211). Russell's book, in other words, is an example of philosophy *as SF*. Russell is quite aware of the fact that in his vision 'features that everybody would consider desirable are mixed with features that are repulsive' (Russell, p. 214). Indeed, the point

of this work, for our purposes, is that it stands as an example of the extrapolation of this older, scientific logic to its ideological conclusions. This is a vision of science as oppressive dogma, a mode of social domination, which frequently finds expression in science fiction. Feyerabend's version of science, which specifically privileges the very 'cranks and anarchists' that Russell dismisses, has by far the greater potential.

### The technological

According to the respected SF author and critic Theodore Sturgeon (1918–1985), 'the word "science" derives from the Latin *scientia*, which means not method or system but *knowledge*. The concept of SF as a "knowledge fiction" satisfied me completely' (Sturgeon, p. 73). Sturgeon prefers this phrase, because it allows him to include, for instance, *The Lord of the Flies* in the SF category 'because of its profound investigation of the origins of religion and secular power in a human society'. The oblique snobbery of such redefinition depends on a buried sense that conventional definitions of SF exclude 'proper' literature (*Brave New World*, *Nineteen Eighty-four*, *Gravity's Rainbow* and the like), leaving the genre with the dregs of populist, Pulp and adventure yarns – a snobbery common to many SF intellectuals and academics, and not without a rationale. But the roots of it as a prejudice are, philosophically, very revealing. And philosophy is the key context here: 'philosophy' (from the Greek, meaning 'love of wisdom') has had its turn as a word for what we nowadays call 'science', particularly as 'natural philosophy'.

The crucial distinction here is not between 'science' and 'knowledge', but between 'science' and 'technology'. These two words are often taken together, with the latter seen as a specific example of the former. According to *Chambers Dictionary of Science and Technology*, technology is 'the practice, description and terminology of any of the applied sciences which have practical value and/or industrial use' (Walker, p. 1150). But in fact this distinction uncovers a split at the very root of the discourse within which 'science fiction' (among many other things) needs to be oriented. The definition of science evoked in Walker's particular reference work ('the ordered arrangement of ascertained knowledge, including the methods by which such knowledge is extended and the criteria by which its truth is tested', Walker, p. 1021) draws out the emphasis on 'truth', 'knowledge' and 'order'. Which is to say, 'science' becomes a more or less restrictive idealist philosophical framework, restrictive (as most scientists assert) by the nature of things 'out there'. Technology, on the other hand, is the discourse of tools and machines, 'tools' being extensions of the human worker, like hammer and saws, and 'machines' being devices that stand apart from the human worker. Friedrich Engels (1820–1895) was one of the first to make this distinction between the tool and the machine, and did so by way of articulating what he saw as the nature of the Industrial Machine, which tends to 'alienate' humanity from its own labour. But, taken conceptually, we find tools and machines at the core of most science fiction: such that spaceships, robots, time-machines and virtual technology (computers and virtual realities) are the four most commonly occurring tropes of the

field: which is to say, Suvin's novum is almost always technological in form. There are nova of a more conceptual or 'scientific' nature, of course; but it is rare for these to be wholly uninvolved with technology. Ursula Le Guin's conceptual novum in *The Left Hand of Darkness* (1969) postulates an alien people without fixed gender, but her novel also includes a series of technological nova, among them the 'ansible' (a faster-than-light communications device) and a spaceship. Christopher Priest's *Inverted World* (1974) presents us with a striking 'science' fictional tale, a case of upended scientific logics, a city whose inhabitants live not (as we do) in a finite world located within an infinite universe, but in an infinite world within a finite universe. Nevertheless the narrative resolves itself back into 'technology fiction' at the end, with the apparent nature of the world revealed as a function of the particular energy technologies that power the motile city at the centre of the book.

Despite the genre's reliance on technology, and despite the many brilliant effects that machines and tools can achieve within the aesthetic framework of an SF text, there remains a certain bias. 'The novel of ideas' has traditionally been privileged over the instrumental novel of the machine, in the same way that 'real fiction' (meaning a particular sub-genre of 'mainstream, literary fiction') is privileged over science fiction by the literary establishment. It is only relatively recently, in philosophical terms, that discourses have been developed to allow us to challenge this prejudice.

One of the most influential philosophical interventions in the question of 'technology' is the 1953 essay 'The Question of Technology' by the German philosopher Martin Heidegger (1889–1976). Heidegger takes the word back to its Greek roots: 'from earliest times until Plato the word *technê* is linked to the word *epistêmê*', but from Plato and Aristotle onwards a distinction begins to be made between them (Heidegger, pp. 318–19). *Ἐπιστήμη* (*epistêmê*) is the Greek word for 'knowledge' (it is the root of the English word 'epistemology'), and by extension it means 'finding things out about the universe' in an open-ended, dialectical manner; which is to say, it means 'science'. *Τέχνη* (*technê*), on the other hand, the root of the word 'technology', means 'a specific skill or ability', the knowledge of how to make something, and is used, by extension, to mean 'cunning devices, arts, wiles'. English has a similar complex of implication in the word 'artificial', which means both 'the work of an artificer or artist' (where 'art' has positive implication) and something suspect, *ersatz*, less-than-real. Fifth- and fourth-century BC Greek thinkers divided these two forms of 'knowledge': Plato and Aristotle reserved 'episteme' to themselves, and dismissed 'technê' as the trick of the unethical, rhetoric-rather-than-truth 'Sophists'. According to Bernard Stiegler:

The separation is determined by a political context, one in which the philosopher accuses the Sophist of instrumentalizing the *logos* ['truth', 'knowledge', 'the underlying order of things']; *logos* also means 'the word' as rhetoric and logography, that is, both as an instrument of power and a renunciation of knowledge ... It is in the inheritance of this conflict – in which the philosophical *episteme* is pitched against the sophistic *technê*, whereby all technical knowledge

is devalued – that the essence of technical beings in general is conceived. (Stiegler, p. 1; my gloss)

By 'instrumentalizing the *logos*', Stiegler means that the Sophists were accused of turning 'truth' into an instrument, of being amorally concerned with the means rather than ends. As this distinction is traced down the centuries of philosophical tradition, we can see that 'technê' becomes associated with an emptying out of meaning and validity. For example, Stiegler quotes Edmund Husserl's assessment that 'algebra' is the 'emptying of meaning' from 'the actually spatio-temporal idealities' of geometry, constituting 'a mere art of achieving results, through a calculating technique according to technical rules' (Husserl, *The Crisis of the Universal Sciences and Transcendental Phenomenology* (1970), quoted in Stiegler, p. 3).

Heidegger's essay challenges, and indeed overturns, this understanding of 'technics'. For him technology is not an instrument, it is a mode of knowing, 'a mode of revealing ... where *atêtheia*, truth, happens' (Heidegger, p. 319). Far from seeing technology as merely the 'practice of science', Heidegger argues that science is in fact a function of technology. He means this not only in the sense that 'modern physics, as experimental, is dependent upon technical apparatus' (Heidegger, pp. 319–20), although this is of course true. He means rather, in the words of Timothy Clark, that technology 'is not the application of science. There is not the-ory on the one side and its practical implementation on the other. Rather science is one manifestation of the technological stance towards entities' (Clark, p. 37). Heidegger thinks that technology, from windmills to hydroelectric plants, 'enframes' the world in a certain way, allowing or shaping the ways in which we 'know' the world around us.

It may be that technology encourages us to think of the world only as what Heidegger calls 'standing-reserve', a quantity of raw material to be harnessed; and indeed it is possible to take Heidegger's essay as a statement of hostility to the increasing pace of technological change (politically conservative, Heidegger declared his preference for windmills over hydroelectric plants, and indeed felt physically sick in modern cities 'surrounded on every side by mechanization and regimented space', Clark, p. 36). But this is not what 'The Question of Technology' is saying. As a mode of knowing, of enframing, the world, technology is 'not something fundamentally new or even modern. Rather it fulfils Western Philosophy's oldest desire for knowledge of what is real' (Scharff and Dusek, p. 247). Heidegger's undoubted hostility to much modern technology was based not on the fact that it was technology as such, but rather on the peculiarly Heideggerian question of whether it is likely to make us feel 'at home' or not.

Nevertheless, it is Heidegger's insight into the way technology 'enframes' the world for humanity that makes him a crucial (though admittedly unlikely) figure to bring into a discussion of the definition of science fiction. In another essay, 'What Calls for Thinking?' (1954), Heidegger famously, perhaps notoriously, declared 'Science does not think' (Heidegger, p. 373). What he meant by this (and he conceded in the essay that 'this is a shocking statement') was that science does not 'enframe' in the way that technology does. Science fiction, on the other hand,

does think: not only in the sense of rehearsing a great many concepts, possibilities, intellectual dramas and the like, but in this deeper sense of textually enframing the world by positing the world's alternatives. We could say (to adopt Heidegger's idiom) that science does not think *except in science fiction*; but this is actually only a way of saying something simpler: that SF is actually technology fiction in this Heideggerian sense.

It seems perverse to say it, but perhaps it is Heidegger who represents the best starting-point for a thoroughgoing theorisation of 'science fiction'. Heidegger's most famous philosophical work centred not on questions of technology, but on the issue of 'Being', the ontological condition of humanity. Bernard Stiegler, in his complex ongoing theoretical study *Technics and Time*, has set out to revise Heidegger's philosophy of *Dasein*, or 'Being', to allow certain technological objects (he is a little obscure as to which precisely) access to the same authentic Being-in-the-World that characterises human beings. Heidegger distinguishes between the existence of a creature like a man (*Dasein*) and the existence of an object which we categorise solely in terms of its use (*Zuhandenheit*). Yet according to Stiegler this denigration of the 'technical object' becomes less and less tenable in a world in which the technological not only interpenetrates human life at almost every level, but in which such objects themselves move further from the sort of dumb instrumentality that characterises a spade or a pair of glasses, and closer to the thinking-machine and the self-aware object. On the other hand, no machine in the present world is truly self-aware. To speak more precisely, the place where Stiegler's technological *Dasein* actually obtains is science fiction itself. One of the key themes of SF for the last half-century has been precisely to delineate and explore the place where the technical object achieves *Dasein*, a Being-in-the-World and a Being-towards-Death. Neither a chair, a typewriter nor a thermostat can have 'authentic' Being in the sense that Heideggerians, or existential philosophers, use the word: but Asimov's robots all possess precisely this quality.

It can be argued, and with some justification, that SF has rarely followed through the possibilities that this philosophical state of affairs has afforded it: that when the 'technical' has been introduced, it has more often than not been to denigrate it. Stiegler considers the newest technologies of genetic manipulation, concluding that 'they make imaginable and possible the fabrication of a "new humanity"':

without having to dive into science-fiction nightmares, one can see that even their simple current applications destroy the oldest ideas that humanity has of itself – and this, at the very moment when psychoanalysis and anthropology are exhuming the constitutive dimension of these ideas, as much for the psyche as for the social body ... [technology is] for the first time directly confronting the very form of this question: what is the nature of the human. (Stiegler, p. 87)

Donna Haraway is the most famous cultural critic to celebrate the possibilities of this technological reinvention of the category 'human' in terms of its diversity and possibility, as well as insisting on the increasing relevance of talking in terms of

'the inextricable weave of the organic, technical, textual, mythic, economic and political threads that make up the flesh of the world' (Haraway, in Gray, p. xii). Like Haraway, Stiegler argues that 'the human is a technical being that cannot (merely) be characterised physiologically and specifically (in the zoological sense)' (Stiegler, p. 50); although, unlike Haraway, Stiegler's emphasis is on ontology, rather than on the many technical prostheses that augment contemporary life as such. Similarly, with regard to culture and society he is adamant that 'the technical dynamic precedes the social dynamic and imposes itself thereupon' (Stiegler, p. 67). In both cases, it is a 'technical fiction' rather than a 'science fiction' more generally conceived that is able to penetrate to the root of things.

Machines today are redefining the human; and yet the dominant story-thread of twentieth-century mainstream SF has been precisely how machines *return* to humanity, how their developmental trajectory brings them back into discourses of humanity. Asimov's story 'The Bicentennial Man' (1976) is a core fable in this regard. After decades of robot stories in which he used the trope of 'the robot' as a means of exploring aspects of humanity, Asimov finally wrote a story about a robot literally turning himself into a human being (his own assessment of the story is that 'of all the robot stories I ever wrote [it] is my favourite and, I think, the best', Asimov, *The Complete Robot*, p. 603). Andrew Martin begins the story as a metal creature with a positronic brain, whose being is entirely determined by the 'three laws of robotics' for which Asimov is famous. A flaw in his programming makes him creative (a flaw erased by his manufacturers in all subsequent robots), and during his lifetime he accumulates money through royalties earned on his art, enabling him first to buy his freedom, then to have the metal portions of his body replaced with organic ones, and finally to petition the Legislative Establishment to have himself legally recognised as human. Public opinion makes this impossible, despite Andrew Martin's egregious virtue, until he instructs a surgeon to make one last adjustment: 'decades ago, my positronic brain was connected to organic nerves. Now, one last operation has arranged that connection in such a way that slowly – quite slowly – the potential is being drained from my pathways' (Asimov, *The Complete Robot*, p. 680). By dying, the robot sways public opinion; on his 200th birthday he is declared human, and dies. By taking on human weakness the machine is able to take on Being-towards-Death, and this defuses human fear of the machine. We see this same archetypal narrative structure in a great deal of science fiction: the character of the android Data in *Star Trek: the Next Generation* who yearns, Pinocchio-like, to become human is never challenged in his strange desire. Robot stories can be traced back to fables in which automata are mistaken for human beings such as Hoffman's 'Der Sandmann' (1816) or J. Storer Clouston's *Button Brains* (1933), the point of such tales being the transfer from a machinic to a humanitarian ethic and logic.

The demonisation of the machine is a continuing aesthetic SF strategy: Gregory Benford's 'Ocean' series of novels, beginning with *In the Ocean of the Night* (1977), postulates a galactic conflict between organic life and a brutalising inorganic machine race. The narrative arc of the first 100 *Perry Rhodan* novels (1961–71) pits the 'peace lord of the universe' against the malign 'robot regent' of the planet



Arkon. The Star Trek franchise has returned many times to the machinic villains named 'The Borg'. The vastly popular *Matrix* films pit organic life in a massive, violent war against 'the machines'. And so on through a thousand examples, with only a few SF authors of merit positing the opposite line (Greg Egan is, perhaps, the most eminent of these).

Why this bias? In philosophical terms, the machines are seen as inherently less authentic than organic life because they fall under the rubric of *techné* rather than *epistémé*; it is this rhetoric that governs the devaluing of the machinic. 'Good' means amenable to humanisation, like Asimov's saintly Bicentennial Man; 'bad' means resistant to this process. More recent SF has been bolder in deconstructing this notion, with a range of cyberpunk and other texts exploring the validities of a technological perspective, but the bulk of the genre reproduces the ancient bias.

A number of more recent theorists and philosophers have published work which provides a way out of this constrictive dilemma, but it has achieved a lesser cultural penetration than it deserves. The thought of the French philosopher Michel Serres (b. 1930) challenges the very notion that two separate cultures, such as 'art and science', actually exist. Serres' focus is always on the connections between the various discourses of science, culture and thought, and although these connections are not straightforward ('from the sciences of man to the exact sciences, or inversely, the path does not cross a homogeneous and empty space ... it follows a path that is difficult to gauge') they are crucial. As he apophthegmatically puts it, 'criticism is a generalised physics' (Serres, p. xi). Neither science, art nor religion is composed of 'facts' or 'predicates'; instead they are determined by the complex dynamics of interrelations. Science fiction is the proper literature for this, and Serres has published a critical monograph on at least one SF author (*Jouvenances: Sur Jules Verne*, 1974). A much more influential French thinker, Gilles Deleuze (1925–1995), published a wide range of philosophical texts attacking essentialism and revising reality wholly in terms of 'machines' – 'desiring machines' and machines productive of all manner of flow (interrupted by various sorts of 'interruption' machine) as a means of replacing the older atomic or 'monadic' bias of the western scientific tradition. For Deleuze this machinic rhizomatic 'becoming' is something enthusiastically to be celebrated. The opening of one of his most famous books, *L'Anti-Oedipe* ('The Anti-Oedipus', 1972, co-written with Félix Guattari) revels in the machinic cosmos of 'desiring production', the strenuously joyful functioning of desire itself:

It is at work everywhere, functioning smoothly at times, at other times in fits and starts. It breathes, it heats, it eats. It shits and fucks. What a mistake to have ever said *the* id. Everywhere *it* is machines – real ones, not figurative ones: machines driving other machines, machines being driven by other machines, with all the necessary couplings and connections. An organ-machine is plugged into an energy-source-machine: the one produces a flow that the other interrupts. The breast is a machine that produces milk, and the mouth a machine coupled to it. (Deleuze and Guattari, p. 1)

This is the fluid ecstasy of the modern world; and which literature is better placed to apprehend it than SF?

### 'In real life' and 'in SF'

My own training and biases as a critic have left me suspicious of binaries, and I worry that precisely such a binary model has emerged from this chapter of definitions. Any distinguishing of 'realist' and 'science-fictional', of course, occurs under the sign of erasure, as it were; and reading texts through these notional categories happens always with a sense of the ways in which the two terms bleed into one another, the ways in which SF writers utilise realist strategies, and 'realism' itself, are always contingent on the sorts of imaginative and speculative constructions that characterise SF. The same is true of the blurred binaries 'art/science', 'romance/the novel' and 'science/technology'; in each case there is no prior term, and the interplay between the categories must be understood as fully dialectic and in process. But in this chapter I have not, I concede, quite shaken off the dust of one of these binaries, and I want to finish by acknowledging my bias. It has to do with the different understandings of the 'science' that underpins science fiction, and the sorts of fictions that result from them.

A shorthand for this binary, although not a very satisfactory one, might be 'Hard SF' versus 'Soft SF', a distinction often made by SF fans themselves. More precisely, we might say, it is the difference between the science in science fiction deriving from the rigid, Russellian notion (with correlatives of 'truth' and 'correctness'), and the science in science fiction deriving from the anarchical Feyerabendian sense of the term (with correlatives of 'imaginative intellectual play' and 'extrapolation'). My preference as a reader and writer is for the latter. However, many SF writers and fans take a particular pleasure in the correctness of the science of science fiction, 'correct' here being understood as 'not transgressing the laws of science as they are presently understood'. Gwyneth Jones asks: 'Does it matter if the science is sound? The fantasy fanciers will say no, the SF faithful will say yes.' She goes on to point out that Larry Niven's Hugo and Nebula Award-winning *Ringworld* (1970), 'one of the great, classic "engineering feat" SF novels, reached print in the first instance with terrible mistakes in its science', and that Niven, 'as free as any SF novelist alive from moral qualms about social verisimilitude or cultural relativity, acquiesced to the helpful advice he received from Dyson Sphere buffs, and obediently corrected his fantasy for later editions' (Jones, p. 16).

The shibboleth here is consistency, and one problem with its application is that fans tend to overlook substantive transgressions of scientific orthodoxy (spacecraft that can travel faster than light) while becoming agitated about minor features (the mechanism by which Niven's 'ringworld', a massive ring of habitable land circling a star, is kept precisely in its orbit). This inconsistency in applying, precisely, criteria of consistency reveals an ideological ground; for only an ideological belief in science as 'truth' can sanction the sort of misprision necessarily perpetuated by this sort of analysis. Another example: Robert Lambourne, Michael Shallis and Michael Shortland analyse various SF texts that deal with centrifugal forces. Space

habitats or spacecraft that are spun to give the illusion of gravity in a free-fall environment are a popular recourse of the SF text, in part because such centrifugal environments avoid the need for the 'pseudo-science' artificial gravity. Lambourne et al. discuss the way the Coriolis effect, created by the constant rotation, would determine life inside such an environment:

In the short story 'Small World' (1978), by Bob Shaw, for example, a projectile is described as travelling across a cylindrical space habitat along an S-shaped trajectory. In fact, the reversal of the Coriolis force after the projectile passes the midpoint of its course and starts its descent, means that the path is C-shaped when viewed from the drum, as shown in figure 5(b). (Lambourne et al., p. 55)

The category error here is the 'in fact'. A story is not 'fact'; nor does fictional entry into one or other discourse of science render it so. Application of conventional scientific orthodoxy as a criterion of judgement for an aesthetic object is fundamentally foolish even when applied with absolute consistency; and when applied inconsistently, as it often is (swallowing the camel of faster-than-light travel but straining at the gnat of, for instance, S-shaped ballistic trajectories inside spinning environments) it combines deadness with muddle. Our choice is between a textual universe run along the oppressive lines of Russell's scientific world government, or a science fiction that plays anarchically with 'science' along the lines Feyerabend suggests. This seems to me no choice at all.

And yet there is *something* in Lambourne's 'in fact'. A personal anecdote: I sat in a cinema audience in Aberdeen when the film *Star Trek III: The Search for Spock* was first shown in that city in 1985. In the film the Federation starship *Enterprise* has been stolen by its former captain, Kirk, so that he and a few of his friends can go on an unauthorised search for his colleague Spock, who is believed dead. This crew of paunchy old geezers finds Spock's rejuvenated body on an artificially created 'Genesis' planet. But they have been followed through space by a band of marauding and violent Klingon warriors who challenge the ship to a space-duel, even though the Klingon craft is a tiny fighter and the *Enterprise* a massive starship. As it happens, because the *Enterprise* is without its usual complement of crew, it is extremely vulnerable (though the Klingons do not realise this). The Klingons fire, and with one shot they disable the *Enterprise*. At this moment in the film, with a shot on screen of the Klingon ship positioned in space directly in front of the *Enterprise*, I heard somebody behind me in the cinema stage-whispering to his companion: 'Dear me, no, of course that's a Klingon D7 pseudo-fighter; it doesn't fire disruptor bolts like that. In real life this confrontation couldn't really happen.'

'In real life.' We are familiar with the idea that films reflect 'real life' poorly. On screen the good guy always wins the girl, we see the threatened disaster averted in the nick of time, the bad guy getting his comeuppance, and in each case we are aware of the fact that in the world we actually inhabit these things do not often happen that way. But the consensus 'real life isn't like that' is usually applied to films that mimic our actual existence; the sentence 'real life is nothing like *Notting Hill* or *Die Hard* or *When Harry Met Sally*' is one form of locution. The sentence 'real

life is nothing like this scene in *Star Trek III: The Search for Spock*' is quite another, and the difference between them is instructive.

As a statement to the effect that actual life bears no resemblance to the special effects, future-world space battle of this particular film, the sentence is strictly accurate: 'in real life, the primitiveness of contemporary space technology and the non-existence of alien races means that no such space battle is possible'. But it is clear that the speaker did not mean the words in that sense. He meant 'this cinematic representation of a battle between a Federation cruiser and a Klingon pseudo-fighter does not map accurately onto the *reality* of such a battle'. What might this reality be, as far as this individual is concerned?

To answer this question is to excavate a little the cultural phenomenon of *Star Trek*, and of Fandom more generally. Fans are integral to the way contemporary SF operates: numerous fan-created magazines, websites and conventions generate much of the energy on which the continuing vitality of the genre depends. Yet the 'fan', and especially the 'science fiction fan', has a very low cultural currency today. He or she exists in a cultural climate of low-level ridicule and dismissal; thought of as obsessive cultists; unskilled at social interaction, physically unattractive and unhygienic, outsiders, nerds; to instance a cultural icon with whom many people will be familiar, the comic book store owner in *The Simpsons* cartoon series. Behind all this negative social construction (which, as with any derogatory stereotype, relates less to reality and more to prevalent ideological fascinations and anxieties) is the twofold baseline perception: that fans are '*fannatical*' (the former term, of course, derived originally from the latter) in some dangerous sense; and that fans are *passive* receptacles of consumer culture.

The American critic Henry Jenkins (b. 1958) has done more than anybody else to overturn this cultural stereotype. His breakthrough study *Textual Poachers: Television Fans and Participatory Culture* (1992), working largely with the example of *Star Trek* fans, demonstrated that fans, far from being passive, are often extremely active, both in proselytising for their favourite shows and in terms of textual production – re-appropriating material from those shows, writing their own fiction and producing their own art (often in 'slash zines', in which two favourite characters are placed in erotic congruence, their names separated by a slash: 'Kirk/Spock', for example). Jenkins shows the extent to which fans are *creative*, active participants in the textual universes of their favourite shows.<sup>2</sup> Jenkins' liberating analysis not only critiques the lazy stereotyping tendencies of modern society; it opens up the 'fan' as a crucial category for any analysis of SF. The important thing about fans is that they care, and they care in an active, engaged and creative way. They care (as in the example of *Star Trek III*) about consistency; about production values; about the quality and range of the texts available to them. They champion the works they admire, and often they strive directly to involve themselves in that work. Naturally, this enthusiasm can slide into cliquishness, in which schoolyard shibboleths are used to determine who is 'us' and who 'not us'. Moreover, I suspect that few people who have spent time with fans at conventions and elsewhere will disagree when I describe this sort of siege mentality, which can spill into tribal obstinacy or paranoia. But the fundamental point is that fans love

SF, and love is not an emotion to be treated lightly. Most SF authors working today (I'm tempted to say *all*) began as fans, and many continue as fans. Science fiction is a community, not an elite. Fans more often than not embody a huge, detailed and working knowledge of their genre, and can locate new texts within a framework of intertextual reference and connection with impressive facility. And the trope of 'the fan' embodies not only actual humans who follow SF, but the position of the new SF text (novel, film) in respect of the whole genre, and – as I have been arguing – in an ideal sense the relationship (active, engaged, creative) between 'SF' and science that underpins the definition of the genre this chapter has sought to sketch.

### Conclusion

The three definitions of SF cited at the beginning of this chapter remain extremely useful for scholars in the field, despite the tendency of some critics to nibble away at them. This chapter has sought not to replace Suvin's, Delany's and Broderick's definitions, but to go a little deeper into some of the assumptions underlying 'science fiction' as a piece of terminology. My conclusion is that SF is better defined as 'technology fiction' provided we take 'technology' not as a synonym for 'gadgetry' but in a Heideggerian sense as a mode of 'enframing' the world, a manifestation of a fundamentally philosophical outlook. As a genre, therefore, SF textually embodies this 'enframing', taking as its 'standing reserve' not only the discourses of science and technology, but also the whole backlist of SF itself, the intertextual tradition that this study will go on to examine. To the extent that SF enters into the discourse of 'science' (as it very frequently does) the best way of theorising this is as a Feyerabendian proliferation of theories rather than a notional uniformity or 'truth'. The useful shorthand for this is 'Fortean', from the writings of the American journalist and writer Charles Fort (1874–1932). This pluralism, and range of speculative possibility, frees SF from what Heidegger saw as the danger in technological 'enframing', the way in which 'it banishes man into the kind of revealing that is an ordering. Where this ordering holds sway, it drives out every other possibility of revealing' (Heidegger, p. 332). In this philosophical sense, SF must be a disorderly technology fiction.

I should perhaps add that many readers of SF will not recognise the genre from my description here. 'Technology fiction' is most often taken as precisely the bland, gadget-driven narratives I say it should not be: 'Hard SF' either as machine or cosmological fiction – stories about spacecraft, weapons, prostheses, or about the universe as physics presently understands it, in which an iron rule of 'truth' applies. 'Soft SF', on the other hand, is given more leeway by readers. By what strange logic 'techno' fiction finds itself falling back against this untested and ultimately Platonic absolute 'truth', and 'science' fiction finds itself able to explore the imaginative possibilities of human thought untrammelled by such concerns is not immediately clear. My belief, although it is not one I hold dogmatically, is that this division is explicable in the context of the historical development of science fiction itself. As outlined in the Preface (and as elaborated in much greater detail

in the whole of this book) I take modern SF to arise at the cleavage of what I call broadly 'Catholic' and 'Protestant' fictive worldviews, a separation I date from around the turn of the seventeenth century.

I should be clear here: I am very specifically *not* saying that science fiction is exclusively a Protestant, and 'Fantasy' exclusively a Catholic, literature. There are very many great Catholic science fiction writers, and many great Protestant Fantasists, and increasingly (although only since the late twentieth century) a very great many excellent SF and Fantasy writers who come from neither cultural milieu. Rather, I am suggesting that, speaking historically, SF expresses a particular dialectic determined originally by the separation of 'Protestant' and 'Catholic' world-views (or if one prefers less sectarianly charged terms, between 'deism' and 'magical pantheism') that emerged in the seventeenth century. SF texts mediate these cultural determinants with different emphases, some more strictly materialist, some more mystical or magical. But without an understanding of the broader historical context many aspects of the tradition of SF are incomprehensible.

I think this explains why a Catholic writer like Jules Verne limits his science fiction to technological devices, where a Protestant writer like H. G. Wells expands his vision in speculative and universal directions. It seems to me (to mention three eminent Catholic writers of the genre) that the 'mystical' turn in SF, the introduction of 'magic' (as in Blish's *Black Sunday*), of God (as 'The Outsider' in Wolfe's *Long Sun* tetralogy) or of miracles (in Miller's *Canticle*) index an impulse to mark out that place where technology ends specifically as a magic, mystic area; the God of the Gaps of which the philosophers sometimes speak. Protestant traditions, such as produced writers like Stapledon, Heinlein or Robinson, are less respectful of the veil of the temple, and produce a different more fully scientific or knowledge fiction. In other words, I am suggesting that it is the mystical, the quasi-religious, that 'enframes' in the limiting and 'ordering' manner deplored by Heidegger: a discourse that insists upon one and only one interpretation of the cosmos.

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## 2 Science Fiction and the Ancient Novel

This study began by arguing that the task of defining science fiction resolves itself not into a pseudo-'truth claim', hard-edged definition of the field, but rather into a delineation of the continuum by which SF can be meaningfully separated out as that form of the Fantastic that embodies a technical (materialist) 'enframing', as opposed to the religious (supernatural) approach we would today call 'Fantasy'.

Looking at the origins of the novel (the mode central to SF for much of its life as a genre) crystallises precisely this question. Margaret Anne Doody notes that the 'history of the novel' advanced by mainstream criticism as dating from the late seventeenth or eighteenth century overlooks the fact that 'the Novel as a form of literature in the West has a continuous history of about two thousand years' (Doody, p. 1). As Doody herself points out, this is no secret: classicists have undertaken many studies of 'the Ancient Novel', a form very popular in the first few centuries AD. Between five and eight complete novels (depending on how long one requires a 'novel' to be), two detailed summaries and a large number of fragments have survived; and these a small fraction of the total number of novels written in Greek and Latin during the classical period.

Doody suggests some of the reasons why almost all critics of the English and Continental novel have ignored this vigorous novelist culture, reasons that are extremely instructive to fans of science fiction. Put briefly, since the eighteenth century there has been a tendency to separate out 'the novel' from 'the romance', reserving serious critical attention for the former (conceived as in essence 'realist') and denigrating the latter as fantastical, escapist or vulgar. Doody's account of the reputation of romance will strike a chord of recognition with the SF aficionado: as a genre it 'is despicable, a term reserved for a certain low section of bookstore ... conveying literary pleasure the critic thinks readers would be better off without. It describes work that fails to meet the requirements of realism' (Doody, pp. 15–16). Nowadays, of course, in Doody's words, 'realism has faded away like the Cheshire cat, leaving its smile of reason behind'. It is time, she insists, 'to drop the pretence that the primary demand of a long work of prose fiction is that it should be "realistic"; a compelling rallying-cry that readers of science fiction have been making, explicitly or implicitly, for decades now.

## Dark They Were, and Golden-Eyed

Although not the first author to write fiction set on Mars, Ray Bradbury staked a major claim to one of the most fertile landscapes in all science fiction with a series of stories published in pulp magazines of the 1940s and '50s in which he envisioned the Red Planet as a new frontier where humanity might leave its imprint, for better or for worse. His collection *The Martian Chronicles* (1950), for which these stories served as a foundation, was a breakthrough success that alerted a mainstream audience to the value of science fiction as a modern mythology that embodies timeless human dreams and fears. Frail and fallible human beings are the foremost concern of Bradbury's fiction, whether in the persona of the fireman in the future dystopia *Fahrenheit 451* who comes to doubt the merits of his job—destroying ideas by burning books—or the ordinary middle-class Americans in the dark fantasy *Something Wicked This Way Comes* who allow fear of their own mortality to coerce them into Faustian pacts with a Mephistophelian owner of a traveling carnival. Bradbury's lyrical stories have been collected in *The Illustrated Man*, *The Golden Apples of the Sun*, *A Medicine for Melancholy*, *The Machineries of Joy*, and numerous other volumes including the definitive *Stories of Ray Bradbury*. The modern Gothic stories in his collections *Dark Carnival* and *The October Country* were a major influence on contemporary horror and dark fantasy fiction. *Dandelion Wine*, his novel of a midcentury Midwestern childhood, and the loose trilogy comprised of *Death Is a Lonely Business*, *A Graveyard for Lunatics*, and *Green Shadows, White Whale*, drawn from his experiences as a young writer, are quintessentially Bradburian explorations of the magic possibilities of everyday life. He has written the children's books *Switch on the Night*, *The Halloween Tree*, and *Ahmed and the Oblivion Machine*, hundreds of poems collected in *The Complete Poems of Ray Bradbury*, a score of plays, including *The Wonderful Ice Cream Suit*, and the essay collection *Yestermorrow*. Many of his stories have been adapted for stage, screen, television, musical theater, and the comics. His own screenwriting credits include *It Came from Outer Space* and the screenplay for John Huston's adaptation of *Moby Dick*. His many awards include the Nebula Grand Master Award and the Bram Stoker Award for Life Achievement from the Horror Writers Association.

THE ROCKET METAL cooled in the meadow winds. Its lid gave a bulging pop. From its clock interior stepped a man, a woman, and three children. The other passengers whispered away across the Martian meadow, leaving the man alone among his family.

The man felt his hair flutter and the tissues of his body draw tight as if he were standing at the center of a vacuum. His wife, before him, seemed almost to whirl away in smoke. The children, small seeds, might at any instant be sown to all the Martian climes.

The children looked up at him, as people look to the sun to tell what time of their life it is. His face was cold.

"What's wrong?" asked his wife.

"Let's get back on the rocket."

"Go back to Earth?"

"Yes! Listen!"

The wind blew as if to flake away their identities. At any moment the Martian air might draw his soul from him, as marrow comes from a white bone. He felt submerged in a chemical that could dissolve his intellect and burn away his past.

They looked at Martian hills that time had worn with a crushing pressure of years. They saw the old cities, lost in their meadows, lying like children's delicate bones among the blowing lakes of grass.

"Chin up, Harry," said his wife. "It's too late. We've come over sixty million miles."

The children with their yellow hair hollered at the deep dome of Martian sky. There was no answer but the racing hiss of wind through the stiff grass.

He picked up the luggage in his cold hands. "Here we go," he said—a man standing on the edge of a sea, ready to wade in and be drowned.

They walked into town.

THEIR NAME WAS Bittering. Harry and his wife Cora; Dan, Laura, and David. They built a small white cottage and ate good breakfasts there, but the fear was never gone. It lay with Mr. Bittering and Mrs. Bittering, a third unbidden partner at every midnight talk, at every dawn awakening.

"I feel like a salt crystal," he said, "in a mountain stream, being washed away. We don't belong here. We're Earth people. This is Mars. It was meant for Martians. For heaven's sake, Cora, let's buy tickets for home!"

But she only shook her head. "One day the atom bomb will fix Earth. Then we'll be safe here."

"Safe and insane!"

*Tick-tock, seven o'clock* sang the voice-clock; *time to get up*. And they did.

Something made him check everything each morning—warm hearth, potted

blood-geraniums—precisely as if he expected something to be amiss. The morning paper was toast-warm from the 6 A.M. Earth rocket. He broke its seal and tilted it at his breakfast place. He forced himself to be convivial.

“Colonial days all over again,” he declared. “Why, in ten years there’ll be a million Earthmen on Mars. Big cities, everything! They said we’d fail. Said the Martians would resent our invasion. But did we find any Martians? Not a living soul! Oh, we found their empty cities, but no one in them. Right?”

A river of wind submerged the house. When the windows ceased rattling, Mr. Bittering swallowed and looked at the children.

“I don’t know,” said David. “Maybe there’re Martians around we don’t see. Sometimes nights I think I hear ’em. I hear the wind. The sand hits my window. I get scared. And I see those towns way up in the mountains where the Martians lived a long time ago. And I think I see things moving around those towns, Papa. And I wonder if those Martians *mind* us living here. I wonder if they won’t do something to us for coming here.”

“Nonsense!” Mr. Bittering looked out the windows. “We’re clean, decent people.” He looked at his children. “All dead cities have some kind of ghosts in them. Memories, I mean.” He stared at the hills. “You see a staircase and you wonder what Martians looked like climbing it. You see Martian paintings and you wonder what the painter was like. You make a little ghost in your mind, a memory. It’s quite natural. Imagination.” He stopped. “You haven’t been prowling up in those ruins, have you?”

“No, Papa.” David looked at his shoes.

“See that you stay away from them. Pass the jam.”

“Just the same,” said little David, “I bet something happens.”

#### SOMETHING HAPPENED THAT AFTERNOON.

Laura stumbled through the settlement, crying. She dashed blindly onto the porch.

“Mother, Father—the war, Earth!” she sobbed. “A radio flash just came. Atom bombs hit New York! All the space rockets blown up. No more rockets to Mars, ever!”

“Oh, Harry!” The mother held onto her husband and daughter.

“Are you sure, Laura?” asked the father quietly.

Laura wept. “We’re stranded on Mars, forever and ever!”

For a long time there was only the sound of the wind in the late afternoon.

Alone, thought Bittering. Only a thousand of us here. No way back. No way. No way. Sweat poured from his face and his hands and his body; he was drenched in the hotness of his fear. He wanted to strike Laura, cry, “No, you’re lying! The rockets will come back!” Instead, he stroked Laura’s head against him and said, “The rockets will get through someday.”

“Father, what will we do?”

“Go about our business, of course. Raise crops and children. Wait. Keep things going until the war ends and the rockets come again.”

The two boys stepped out onto the porch.

“Children,” he said, sitting there, looking beyond them, “I’ve something to tell you.”

“We know,” they said.

IN THE FOLLOWING days, Bittering wandered often through the garden to stand alone in his fear. As long as the rockets had spun a silver web across space, he had been able to accept Mars. For he had always told himself: Tomorrow, if I want, I can buy a ticket and go back to Earth.

But now: The web gone, the rockets lying in jigsaw heaps of molten girder and unsnaked wire. Earth people left to the strangeness of Mars, the cinnamon dusts and wine airs, to be baked like gingerbread shapes in Martian summers, put into harvested storage by Martian winters. What would happen to him, the others? This was the moment Mars had waited for. Now it would eat them.

He got down on his knees in the flower bed, a spade in his nervous hands. Work, he thought, work and forget.

He glanced up from the garden to the Martian mountains. He thought of the proud old Martian names that had once been on those peaks. Earthmen, dropping from the sky, had gazed upon hills, rivers, Martian seas left nameless in spite of names. Once Martians had built cities, named cities; climbed mountains, named mountains; sailed seas, named seas. Mountains melted, seas drained, cities tumbled. In spite of this, the Earthmen had felt a silent guilt at putting new names to these ancient hills and valleys.

Nevertheless, man lives by symbol and label. The names were given.

Mr. Bittering felt very alone in his garden under the Martian sun, anachronism bent here, planting Earth flowers in a wild soil.

Think. Keep thinking. Different things. Keep your mind free of Earth, the atom war, the lost rockets.

He perspired. He glanced about. No one watching. He removed his tie. Pretty bold, he thought. First your coat off, now your tie. He hung it neatly on a peach tree he had imported as a sapling from Massachusetts.

He returned to his philosophy of names and mountains. The Earthmen had changed names. Now there were Hornel Valleys, Roosevelt Seas, Ford Hills, Vanderbilt Plateaus, Rockefeller Rivers, on Mars. It wasn’t right. The American settlers had shown wisdom, using old Indian prairie names: Wisconsin, Minnesota, Idaho, Ohio, Utah, Milwaukee, Waukegan, Osseo. The old names, the old meanings.

Staring at the mountains wildly, he thought: Are you up there? All the dead ones,

you Martians? Well, here we are, alone, cut off! Come down, move us out! We're helpless!

The wind blew a shower of peach blossoms.

He put out his sun-browned hand, gave a small cry. He touched the blossoms, picked them up. He turned them, he touched them again and again. Then he shouted for his wife.

"Cora!"

She appeared at a window. He ran to her.

"Cora, these blossoms!"

She handled them.

"Do you see? They're different. They've changed! They're not peach blossoms any more!"

"Look all right to me," she said.

"They're not. They're *wrong*! I can't tell how. An extra petal, a leaf, something, the color, the smell!"

The children ran out in time to see their father hurrying about the garden, pulling up radishes, onions, and carrots from their beds.

"Cora, come look!"

They handled the onions, the radishes, the carrots among them.

"Do they look like carrots?"

"Yes . . . no." She hesitated. "I don't know."

"They're changed."

"Perhaps."

"You know they have! Onions but not onions, carrots but not carrots. Taste: the same but different. Smell: not like it used to be." He felt his heart pounding, and he was afraid. He dug his fingers into the earth. "Cora, what's happening? What is it? We've got to get away from this." He ran across the garden. Each tree felt his touch.

"The roses. The roses. They're turning green!"

And they stood looking at the green roses.

And two days later Dan came running. "Come see the cow. I was milking her and I saw it. Come on!"

They stood in the shed and looked at their one cow.

It was growing a third horn.

And the lawn in front of their house very quietly and slowly was coloring itself like spring violets. Seed from Earth but growing up a soft purple.

"We must get away," said Bittering. "We'll eat this stuff and then we'll change—who knows to what? I can't let it happen. There's only one thing to do. Burn this food!"

"It's not poisoned."

"But it is. Subtly, very subtly. A little bit. A very little bit. We mustn't touch it."

He looked with dismay at their house. "Even the house. The wind's done something to it. The air's burned it. The fog at night. The boards, all warped out of shape. It's not an Earthman's house any more."

"Oh, your imagination!"

He put on his coat and tie. "I'm going into town. We've got to do something now. I'll be back."

"Wait, Harry!" his wife cried.

But he was gone.

In town, on the shadowy step of the grocery store, the men sat with their hands on their knees, conversing with great leisure and ease.

Mr. Bittering wanted to fire a pistol in the air.

What are you doing, you fools! he thought. Sitting here! You've heard the news—we're stranded on this planet. Well, move! Aren't you frightened? Aren't you afraid? What are you going to do?

"Hello, Harry," said everyone.

"Look," he said to them. "You did hear the news, the other day, didn't you?" They nodded and laughed. "Sure. Sure, Harry."

"What are you going to do about it?"

"Do, Harry, do? What *can* we do?"

"Build a rocket, that's what!"

"A rocket, Harry? To go back to all that trouble? Oh, Harry!"

"But you *must* want to go back. Have you noticed the peach blossoms, the onions, the grass?"

"Why, yes, Harry, seems we did," said one of the men.

"Doesn't it scare you?"

"Can't recall that it did much, Harry."

"Idiots!"

"Now, Harry."

Bittering wanted to cry. "You've got to work with me. If we stay here, we'll all change. The air. Don't you smell it? Something in the air. A Martian virus, maybe; some seed, or a pollen. Listen to me!"

They stared at him.

"Sam," he said to one of them.

"Yes, Harry?"

"Will you help me build a rocket?"

"Harry, I got a whole load of metal and some blueprints. You want to work in my metal shop on a rocket, you're welcome. I'll sell you that metal for five hundred dollars. You should be able to construct a right pretty rocket, if you work alone, in about thirty years."

Everyone laughed.

"Don't laugh."

Sam looked at him with quiet good humor.

"Sam," Bittering said. "Your eyes—"

"What about them, Harry?"

"Didn't they used to be grey?"

"Well now, I don't remember."

"They were, weren't they?"

"Why do you ask, Harry?"

"Because now they're kind of yellow-colored."

"Is that so, Harry?" Sam said, casually.

"And you're taller and thinner—"

"You might be right, Harry."

"Sam, you shouldn't have yellow eyes."

"Harry, what color eyes have *you* got?" Sam said.

"My eyes? They're blue, of course."

"Here you are, Harry." Sam handed him a pocket mirror. "Take a look at yourself."

Mr. Bittering hesitated, and then raised the mirror to his face.

There were little, very dim flecks of new gold captured in the blue of his eyes.

"Now look what you've done," said Sam a moment later. "You've broken my mirror."

HARRY BITTERING MOVED into the metal shop and began to build the rocket. Men stood in the open door and talked and joked without raising their voices. Once in a while they gave him a hand on lifting something. But mostly they just idled and watched him with their yellowing eyes.

"It's suppertime, Harry," they said.

His wife appeared with his supper in a wicker basket.

"I won't touch it," he said. "I'll eat only food from our Deepfreeze. Food that came from Earth. Nothing from our garden."

His wife stood watching him. "You can't build a rocket."

"I worked in a shop once, when I was twenty. I know metal. Once I get it started, the others will help," he said, not looking at her, laying out the blueprints.

"Harry, Harry," she said, helplessly.

"We've got to get away, Cora. We've got to!"

THE NIGHTS WERE full of wind that blew down the empty moonlit sea meadows past the little white chess cities lying for their twelve-thousandth year in the shallows. In the Earthmen's settlement, the Bittering house shook with a feeling of change.

Lying abed, Mr. Bittering felt his bones shifted, shaped, melted like gold. His wife,

lying beside him, was dark from many sunny afternoons. Dark she was, and golden-eyed, burnt almost black by the sun, sleeping, and the children metallic in their beds, and the wind roaring forlorn and changing through the old peach trees, the violet grass, shaking out green rose petals.

The fear would not be stopped. It had his throat and heart. It dripped in a wetness of the arm and the temple and the trembling palm.

A green star rose in the east.

A strange word emerged from Mr. Bittering's lips.

"*Iorrt. Iorrt.*" He repeated it.

It was a Martian word. He knew no Martian.

In the middle of the night he arose and dialed a call through to Simpson, the archeologist.

"Simpson, what does the word *Iorrt* mean?"

"Why, that's the old Martian word for our planet Earth. Why?"

"No special reason."

The telephone slipped from his hand.

"Hello, hello, hello, hello," it kept saying while he sat gazing out at the green star. "Bittering? Harry, are you there?"

The days were full of metal sound. He laid the frame of the rocket with the reluctant help of three indifferent men. He grew very tired in an hour or so and had to sit down.

"The altitude," laughed a man.

"Are you *eating*, Harry?" asked another.

"I'm eating," he said, angrily.

"From your Deepfreeze?"

"Yes!"

"You're getting thinner, Harry."

"I'm not!"

"And taller."

"Liar!"

HIS WIFE TOOK him aside a few days later. "Harry, I've used up all the food in the Deepfreeze. There's nothing left. I'll have to make sandwiches using food grown on Mars."

He sat down heavily.

"You must eat," she said. "You're weak."

"Yes," he said.

He took a sandwich, opened it, looked at it, and began to nibble at it.

"And take the rest of the day off," she said. "It's hot. The children want to swim in the canals and hike. Please come along."

"I can't waste time. This is a crisis!"

"Just for an hour," she urged. "A swim'll do you good."

He rose, sweating. "All right, all right. Leave me alone. I'll come."

"Good for you, Harry."

The sun was hot, the day quiet. There was only an immense staring burn upon the land. They moved along the canal, the father, the mother, the racing children in their swim suits. They stopped and ate meat sandwiches. He saw their skin baking brown. And he saw the yellow eyes of his wife and his children, their eyes that were never yellow before. A few tremblings shook him, but were carried off in waves of pleasant heat as he lay in the sun. He was too tired to be afraid.

"Cora, how long have your eyes been yellow?"

She was bewildered. "Always, I guess."

"They didn't change from brown in the last three months?"

She bit her lips. "No. Why do you ask?"

"Never mind."

They sat there.

"The children's eyes," he said. "They're yellow, too."

"Sometimes growing children's eyes change color."

"Maybe *we're* children, too. At least to Mars. That's a thought." He laughed. "Think I'll swim."

They leaped into the canal water, and he let himself sink down and down to the bottom like a golden statue and lie there in green silence. All was water-quiet and deep, all was peace. He felt the steady, slow current drift him easily.

If I lie here long enough, he thought, the water will work and eat away my flesh until the bones show like coral. Just my skeleton left. And then the water can build on that skeleton—green things, deep water things, red things, yellow things. Change. Change. Slow, deep, silent change. And isn't that what it is up *there*?

He saw the sky submerged above him, the sun made Martian by atmosphere and time and space.

Up there, a big river, he thought, a Martian river, all of us lying deep in it, in our pebble houses, in our sunken boulder houses, like crayfish hidden, and the water washing away our old bodies and lengthening the bones and—

He let himself drift up through the soft light.

Dan sat on the edge of the canal, regarding his father seriously.

"*Utha*," he said.

"What?" asked his father.

The boy smiled. "You know. *Utha*'s the Martian word for 'father.'"

"Where did you learn it?"

"I don't know. Around. *Utha!*"

"What do you want?"

The boy hesitated. "I—I want to change my name."

"Change it?"

"Yes."

His mother swam over. "What's wrong with Dan for a name?"

Dan fidgeted. "The other day you called Dan, Dan, Dan. I didn't even hear. I said to myself, That's not my name. I've a new name I want to use."

Mr. Bittering held to the side of the canal, his body cold and his heart pounding slowly. "What is this new name?"

"Linnl. Isn't that a good name? Can I use it? Can't I, please?"

Mr. Bittering put his hand to his head. He thought of the silly rocket, himself working alone, himself alone even among his family, so alone.

He heard his wife say, "Why not?"

He heard himself say, "Yes, you can use it."

"Yaaa!" screamed the boy. "I'm Linnl, Linnl!"

Racing down the meadows, he danced and shouted.

Mr. Bittering looked at his wife. "Why did we do that?"

"I don't know," she said. "It just seemed like a good idea."

They walked into the hills. They strolled on old mosaic paths, beside still pumping fountains. The paths were covered with a thin film of cool water all summer long. You kept your bare feet cool all the day, splashing as in a creek, wading.

They came to a small deserted Martian villa with a good view of the valley. It was on top of a hill. Blue marble halls, large murals, a swimming pool. It was refreshing in this hot summertime. The Martians hadn't believed in large cities.

"How nice," said Mrs. Bittering, "if we could move up here to this villa for the summer."

"Come on," he said. "We're going back to town. There's work to be done on the rocket."

But as he worked that night, the thought of the cool blue marble villa entered his mind. As the hours passed, the rocket seemed less important.

In the flow of days and weeks, the rocket receded and dwindled. The old fever was gone. It frightened him to think he had let it slip this way. But somehow the heat, the air, the working conditions—

He heard the men murmuring on the porch of his metal shop.

"Everyone's going. You heard?"

"All going. That's right."

Bittering came out. "Going where?" He saw a couple of trucks, loaded with children and furniture, drive down the dusty street.

"Up to the villas," said the man.

"Yeah, Harry. I'm going. So is Sam. Aren't you, Sam?"

"That's right, Harry. What about you?"

"I've got work to do here."

"Work! You can finish that rocket in the autumn, when it's cooler." He took a breath. "I got the frame all set up."

"In the autumn is better." Their voices were lazy in the heat.

"Got to work," he said.

"Autumn," they reasoned. And they sounded so sensible, so right. Autumn would be best, he thought. Plenty of time, then.

No! cried part of himself; deep down, put away, locked tight, suffocating. No!

No!

"In the autumn," he said.

"Come on, Harry," they all said.

"Yes," he said, feeling his flesh melt in the hot liquid air. "Yes, in the autumn. I'll begin work again then."

"I got a villa near the Tirra Canal," said someone.

"You mean the Roosevelt Canal, don't you?"

"Tirra. The old Martian name."

"But on the map—"

"Forget the map. It's Tirra now. Now I found a place in the Pillan mountains—"

"You mean the Rockefeller Range," said Bittering.

"I mean the Pillan mountains," said Sam.

"Yes," said Bittering, buried in the hot, swarming air. "The Pillan mountains. Everyone worked at loading the truck in the hot, still afternoon of the next day. Laura, Dan, and David carried packages. Or, as they preferred to be known, Ttil, Linnl, and Werr carried packages.

The furniture was abandoned in the little white cottage.

"It looked just fine in Boston," said the mother. "And here in the cottage. But up at the villa? No. We'll get it when we come back in the autumn."

Bittering himself was quiet.

"I've some ideas on furniture for the villa," he said after a time. "Big, lazy furniture."

"What about your encyclopedia? You're taking it along, surely?"

Mr. Bittering glanced away. "I'll come and get it next week."

They turned to their daughter. "What about your New York dresses?"

The bewildered girl stared. "Why, I don't want them any more."

They shut off the gas, the water, they locked the doors and walked away. Father peered into the truck.

"Gosh, we're not taking much," he said. "Considering all we brought to Mars, this is only a handful!"

He started the truck.

Looking at the small white cottage for a long moment, he was filled with a desire

to rush to it, touch it, say good-by to it, for he felt as if he were going away on a long journey, leaving something to which he could never quite return, never understand again.

Just then Sam and his family drove by in another truck.

"Hi, Bittering! Here we go!"

The truck swung down the ancient highway out of town. There were sixty others traveling the same direction. The town filled with a silent, heavy dust from their passage. The canal waters lay blue in the sun, and a quiet wind moved in the strange trees.

"Good-by, town!" said Mr. Bittering.

"Good-by, good-by," said the family, waving to it.

They did not look back again.

SUMMER BURNED THE canals dry. Summer moved like flame upon the meadows. In the empty Earth settlement, the painted houses flaked and peeled. Rubber tires upon which children had swung in back yards hung suspended like stopped clock pendulums in the blazing air.

At the metal shop, the rocket frame began to rust.

In the quiet autumn Mr. Bittering stood, very dark now, very golden-eyed, upon the slope above his villa, looking at the valley.

"It's time to go back," said Cora.

"Yes, but we're not going," he said quietly. "There's nothing there any more."

"Your books," she said. "Your fine clothes."

"Your *Illes* and your fine *ior uele rre*," she said.

"The town's empty. No one's going back," he said. "There's no reason to, none at all."

The daughter wove tapestries and the sons played songs on ancient flutes and pipes, their laughter echoing in the marble villa.

Mr. Bittering gazed at the Earth settlement far away in the low valley. "Such odd, such ridiculous houses the Earth people built."

"They didn't know any better," his wife mused. "Such ugly people. I'm glad they've gone."

They both looked at each other, startled by all they had just finished saying. They laughed.

"Where did they go?" he wondered. He glanced at his wife. She was golden and slender as his daughter. She looked at him, and he seemed almost as young as their eldest son.

"I don't know," she said.

"We'll go back to town maybe next year, or the year after, or the year after that," he said, calmly. "Now—I'm warm. How about taking a swim?"



They turned their backs to the valley. Arm in arm they walked silently down a path of clear-running spring water.

FIVE YEARS LATER a rocket fell out of the sky. It lay steaming in the valley. Men leaped out of it, shouting.

"We won the war on Earth! We're here to rescue you! Hey!"

But the American-built town of cottages, peach trees, and theaters was silent. They found a flimsy rocket frame rusting in an empty shop.

The rocket men searched the hills. The captain established headquarters in an abandoned bar. His lieutenant came back to report.

"The town's empty, but we found native life in the hills, sir. Dark people. Yellow eyes. Martians. Very friendly. We talked a bit, not much. They learn English fast. I'm sure our relations will be most friendly with them, sir."

"Dark, eh?" mused the captain. "How many?"

"Six, eight hundred, I'd say, living in those marble ruins in the hills, sir. Tall, healthy. Beautiful women."

"Did they tell you what became of the men and women who built this Earth-settlement, Lieutenant?"

"They hadn't the foggiest notion of what happened to this town or its people."

"Strange. You think those Martians killed them?"

"They look surprisingly peaceful. Chances are a plague did this town in, sir."

"Perhaps. I suppose this is one of those mysteries we'll never solve. One of those mysteries you read about."

The captain looked at the room, the dusty windows, the blue mountains rising beyond, the canals moving in the light, and he heard the soft wind in the air. He shivered. Then, recovering, he tapped a large fresh map he had thumbtacked to the top of an empty table.

"Lots to be done, Lieutenant." His voice droned on and quietly on as the sun sank behind the blue hills. "New settlements. Mining sites, minerals to be looked for. Bacteriological specimens taken. The work, all the work. And the old records were lost. We'll have a job of remapping to do, renaming the mountains and rivers and such. Calls for a little imagination.

"What do you think of naming those mountains the Lincoln Mountains, this canal the Washington Canal, those hills—we can name those hills for you, Lieutenant. Diplomacy. And you, for a favor, might name a town for me. Polishing the apple. And why not make this the Einstein Valley, and further over . . . are you *listening*, Lieutenant?"

The lieutenant snapped his gaze from the blue color and the quiet mist of the hills far beyond the town.

"What? Oh, yes, sir!"

# The New Wave



The heat was peeling his armoured hide as he struggled to the matter transmitter. It flashed at him with purple flame. Back to the communicator he ran shouting and screaming.

He was still whimpering into it a few minutes later when the mighty ship plunged into the heart of a blue-white sun.

## THE SECOND NIGHT OF SUMMER

JAMES H. SCHMITZ

On the night after the day that brought summer officially to the land of Wend, on the planet of Noorhut, the shining lights were seen again in the big hollow at the east end of Grimp's father's farm.

Grimp watched them for more than an hour from his upstairs room. The house was dark, but an occasional murmur of voices floated up to him through the windows below. Everyone in the farmhouse was looking at the lights.

On the other farms around and in the village, which was over a hill and another two miles up the valley, every living soul who could get within view of the hollow was probably doing the same. For a time, the agitated yelling of the Village Guardian's big pank-hound had sounded clearly over the hill, but he had quieted down then very suddenly—or had *been* quieted down, more likely, Grimp suspected. The Guardian was dead-set against anyone making a fuss about the lights—and that included the pank-hound, too.

There was some excuse for the pank-hound's excitement, though. From the window, Grimp could see there were a lot more lights tonight than had turned up in previous years—big, brilliant-blue bubbles, drifting and rising and falling silently all about the hollow. Sometimes one would lift straight up for several hundred feet, or move off over the edge of the hollow for about the same distance, and hang there suspended for a few minutes, before floating back to the others. That was as far as they ever went away from the hollow.

There was, in fact, no need for the Halpa detector-globes to go any further than that to get the information wanted by those who had sent them out, and who were listening now to the steady flow of brief reports, in some Halpa equivalent of human speech—thought, coming back to them through the globes:

'No signs of hostile activity in the vicinity of the breakthrough point. No weapons or engines of power within range of detection. The area shows no significant alterations since the last investigation. Sharp curiosity among those who observe us consciously—traces of alarm and suspicion. But no overt hostility.'

The reports streamed on without interruption, repeating the same bits of information automatically and incessantly, while the globes floated and dipped soundlessly above and about the hollow. Grimp continued to watch them, blinking sleepily now and then, until a spreading glow over the edge of the valley announced that Noorhut's Big Moon was coming up slowly, like a Planetary Guardian, to make its own inspection of the lights. The globes began to dim out then, just as they always had done at moonrise in the preceding summers; and even before the top rim of the Big Moon's yellow disc edged over the hills, the hollow was completely dark.

Grimp heard his mother starting up the stairs. He got hurriedly into bed. The show was over for the night and he had a lot of pleasant things to think about before he went to sleep.

Now that the lights had showed up, his good friend Grandma Erisa Wannattel and her patent-medicine trailer were sure to arrive, too. Sometime late tomorrow afternoon, the big draft-trailer would come rolling up the valley road from the city. For that was what Grandma Wannattel had done the past four summers—ever since the lights first started appearing above the hollow for the few nights they were to be seen there each year. And since four years were exactly half of Grimp's whole life, that made Grandma's return a mathematical certainty for him.

Other people, of course, like the Village Guardian, might have a poor opinion of Grandma, but just hanging around her and the trailer and the gigantic, exotic-looking rhinoceros pony that pulled it was, in Grimp's opinion, a lot better even than going to the circus.

And vacations started the day after tomorrow! The whole future just now, in fact, looked like one good thing after another, extending through a vista of summery infinities.

Grimp went to sleep happily.

At about the same hour, though at a distance greater than Grimp's imagination had stretched as yet, eight large ships came individ-

ually out of the darkness between the stars that was their sea, and began to move about Noorhut in a carefully timed pattern of orbits. They stayed much too far out to permit any instrument of space-detection to suspect that Noorhut might be their common centre of interest.

But that was what it was. Though the men who crewed the eight ships bore the people of Noorhut no ill will, hardly anything could have looked less promising for Noorhut than the cargo they had on board.

Seven of them were armed with a gas which was not often used any more. A highly volatile lethal catalyst, it sank to the solid surface of a world over which it was freed and spread out swiftly there to the point where its presence could no longer be detected by any chemical means. However, its effect of drawing the final breath almost imperceptibly out of all things that were oxygen-breathing was not noticeably reduced by diffusion.

The eighth ship was equipped with a brace of torpedoes, which were normally released some hours after the gas-carriers dispersed their invisible death. They were quite small torpedoes, since the only task remaining for them would be to ignite the surface of the planet that had been treated with the catalyst.

All those things might presently happen to Noorhut. But they would happen only if a specific message was flashed from it to the circling squadron—the message that Noorhut already was lost to a deadly foe who must, at any cost now, be prevented from spreading out from it to other inhabited worlds.

Next afternoon, right after school, as Grimp came expectantly around the bend of the road at the edge of the farm, he found the village policeman sitting there on a rock, gazing tearfully down the road.

'Hello, Runny,' said Grimp, disturbed. Considered in the light of gossip he'd overheard in the village that morning, this didn't look so good for Grandma. It just didn't look good.

The policeman blew his nose on a handkerchief he carried tucked into the front of his uniform, wiped his eyes, and gave Grimp an annoyed glance.

'Don't you call me Runny, Grimp!' he said, replacing the handkerchief. Like Grimp himself and most of the people on Noorhut, the policeman was brown-skinned and dark-eyed, normally a

rather good-looking young fellow. But his eyes were swollen and red-rimmed now; and his nose, which was a bit larger than average, anyway, was also red and swollen and undeniably runny. He had hay-fever bad.

Grimp apologized and sat down thoughtfully on the rock beside the policeman, who was one of his numerous cousins. He was about to mention that he had overheard Vellit using the expression when she and the policeman came through the big Leeth-flower orchard above the farm the other evening—at a much less leisurely rate than was their custom there. But he thought better of it. Vellit was the policeman's girl for most of the year, but she broke their engagement regularly during hay-fever season and called him cousin instead of dearest.

'What are you doing here?' Grimp asked bluntly instead.

'Waiting,' said the policeman.

'For what?' said Grimp, with a sinking heart.

'Same individual you are, I guess,' the policeman told him, hauling out the handkerchief again. He blew. 'This year she's going to go right back where she came from or get pinched.'

'Who says so?' scowled Grimp.

'The Guardian, that's who,' said the policeman. 'That good enough for you?'

'He can't do it!' Grimp said hotly. 'It's our farm, and she's got all her licences.'

'He's had a whole year to think up a new list she's got to have,' the policeman informed him. He fished in the breastpocket of his uniform, pulled out a folded paper and opened it. 'He put thirty-four items down here I got to check—she's bound to miss on one of them.'

'It's a dirty trick!' said Grimp, rapidly scanning as much as he could see of the list.

'Let's us have more respect for the Village Guardian, Grimp!' the policeman said warningly.

'Uh-huh,' muttered Grimp. 'Sure . . . If Runny would just move his big thumb out of the way. But what a list! Trailer; rhinoceros pony (beast, heavy draft, imported); patent medicines; household utensils; fortune-telling; pets; herbs; miracle-healing—'

The policeman looked down, saw what Grimp was doing and raised the paper out of his line of vision. 'That's an official document,' he said, warding Grimp off with one hand and tucking the

paper away with the other. 'Let's us not get our dirty hands on it.'

Grimp was thinking fast. Grandma Wannattel did have framed licences for some of the items he'd read hanging around inside the trailer, but certainly not thirty-four of them.

'Remember that big skinless werret I caught last season?' he asked.

The policeman gave him a quick glance, looked away again and wiped his eyes thoughtfully. The season on werrets would open the following week and he was as ardent a fisherman as anyone in the village—and last summer Grimp's monster werret had broken a twelve-year record in the valley.

'Some people,' Grimp said idly, staring down the valley road to the point where it turned into the woods, 'would sneak after a person for days who's caught a big werret, hoping he'd be dumb enough to go back to that pool.'

The policeman flushed and dabbed the handkerchief gingerly at his nose.

'Some people would even sit in a haystack and use spyglasses, even when the hay made them sneeze like crazy,' continued Grimp quietly.

The policeman's flush deepened. He sneezed.

'But a person isn't that dumb,' said Grimp. 'Not when he knows there's anyway two werrets there six inches bigger than the one he caught.'

'Six inches?' the policeman repeated a bit incredulously—eagerly. 'Easy,' nodded Grimp. 'I had a look at them again last week.'

It was the policeman's turn to think. Grimp idly hauled out his slingshot, fished a pebble out of his small-pebble pocket and knocked the head off a flower twenty feet away. He yawned negligently.

'You're pretty good with that slingshot,' the policeman remarked. 'You must be just about as good as the culprit that used a slingshot to ring the fire-alarm signal on the defence unit bell from the top of the school house last week.'

'That'd take a pretty good shot,' Grimp admitted.

'And who then,' continued the policeman, 'dropped pepper in his trail, so the pank-hound near coughed off his head when we started to track him. The Guardian,' he added significantly, 'would like to have a clue about that culprit, all right.'

'Sure, sure,' said Grimp, bored. The policeman, the Guardian, and probably even the pank-hound, knew exactly who the culprit was; but they wouldn't be able to prove it in twenty thousand years. Runny just had to realize first that threats weren't going to get him anywhere near a record werret.

Apparently, he had; he was settling back for another bout of thinking. Grimp, interested in what he would produce next, decided just to leave him to it. . . .

Then Grimp jumped up suddenly from the rock.

'There they are!' he yelled, waving the slingshot.

A half-mile down the road, Grandma Wannattel's big, silvery trailer had come swaying out of the woods behind the rhinocerne pony and turned up towards the farm. The pony saw Grimp, lifted its head, which was as long as a tall man, and bawled a thunderous greeting. Grandma Wannattel stood up on the driver's seat and waved a green silk handkerchief.

Grimp started sprinting down the road.

The werrets should turn the trick—but he'd better get Grandma informed, just the same, about recent developments here, before she ran into Runny.

Grandma Wannattel flicked the pony's horny rear with the reins just before they reached the policeman, who was waiting at the side of the road with the Guardian's check-list unfolded in his hand.

The pony broke into a lumbering trot, and the trailer swept past Runny and up around the bend of the road, where it stopped well within the boundaries of the farm. They climbed down and Grandma quickly unhitched the pony. It waddled, grunting, off the road and down into the long, marshy meadow above the hollow. It stood still there, cooling its feet.

Grimp felt a little better. Getting the trailer off community property gave Grandma a technical advantage. Grimp's people had a favourable opinion of her, and they were a sturdy lot who enjoyed telling off the Guardian any time he didn't actually have a law to back up his orders. But on the way to the farm, she had confessed to Grimp that, just as he'd feared, she didn't have anything like thirty-four licences. And now the policeman was coming up around the bend of the road after them, blowing his nose and frowning.

'Just let me handle him alone,' Grandma told Grimp out of the corner of her mouth.

He nodded and strolled off into the meadow to pass the time with the pony. She'd had a lot of experience in handling policemen.

'Well, well, young man,' he heard her greeting his cousin behind him. 'That looks like a bad cold you've got.'

The policeman sneezed.

'Wish it were a cold,' he said resignedly. 'It's hay-fever. Can't do a thing with it. Now I've got a list here—'

'Hay-fever?' said Grandma. 'Step up into the trailer a moment. We'll fix that.'

'About this list—' began Runny, and stopped. 'You think you got something that would fix it?' he asked sceptically. 'I've been to I don't know how many doctors and they didn't help any.'

'Doctors!' said Grandma. Grimp heard her heels click up the metal steps that led into the back of the trailer. 'Come right in, won't take a moment.'

'Well—' said Runny doubtfully, but he followed her inside. Grimp winked at the pony. The first round went to Grandma.

'Hello, pony,' he said.

His worries couldn't reduce his appreciation of Grandma's fabulous draft-animal. Partly, of course, it was just that it was such an enormous beast. The long, round barrel of its body rested on short legs with wide, flat feet which were settled deep in the meadow's mud by now. At one end was a spiky tail, and at the other a very big, wedge-shaped head, with a blunt, badly chipped horn set between nose and eyes. From nose to tail and all around, it was covered with thick, rectangular, horny plates, a mottled green-brown in colour.

Grimp patted its rocky side affectionately. He loved the pony most for being the ugliest thing that had ever showed up on Noorhut. According to Grandma, she had bought it from a bankrupt circus which had imported it from a planet called Treebel; and Treebel was supposed to be a world full of hot swamps, in-exhaustibly explosive volcanoes and sulphurous stenches.

One might have thought that after wandering around melting lava and under rainfalls of glowing ashes for most of its life, the pony would have considered Noorhut pretty tame. But though there wasn't much room for expression around the solid slab of bone supporting the horn, which was the front of its face, Grimp thought it looked thoroughly contented with its feet sunk out of sight in Noorhut's cool mud.

'You're a big fat pig!' he told it fondly.

The pony slobbered out a long, purple tongue and carefully parted his hair.

'Cut it out!' said Grimp. 'Ugh!'

The pony snorted, pleased, curled its tongue about a huge clump of weeds, pulled them up and flipped them into its mouth, roots, mud and all. It began to chew.

Grimp glanced at the sun and turned anxiously to study the trailer. If she didn't get rid of Runny soon, they'd be calling him back to the house for supper before he and Grandma got around to having a good talk. And they weren't letting him out of doors these evenings, while the shining lights were here.

He gave the pony a parting whack, returned quietly to the road and sat down out of sight near the back door of the trailer, where he could hear what was going on.

'...so about the only thing the Guardian could tack on you now,' the policeman was saying, 'would be a Public Menace charge. If there's any trouble about the lights this year, he's likely to try that. He's not a bad Guardian, you know, but he's got himself talked into thinking you're sort of to blame for the lights showing up here every year.'

Grandma chuckled. 'Well, I try to get here in time to see them every summer,' she admitted. 'I can see how that might give him the idea.'

'And of course,' said the policeman, 'we're all trying to keep it quiet about them. If the news got out, we'd be having a lot of people coming here from the city, just to look. No one but the Guardian minds you being here, only you don't want a lot of city people tramping around your farms.'

'Of course not,' agreed Grandma. 'And I certainly haven't told anyone about them myself.'

'Last night,' the policeman added, 'everyone was saying there were twice as many lights this year as last summer. That's what got the Guardian so excited.'

Chafing more every minute, Grimp had to listen then to an extended polite argument about how much Runny wanted to pay Grandma for her hay-fever medicines, while she insisted he didn't owe her anything at all. In the end, Grandma lost and the policeman paid up—much too much to take from any friend of Grimp's folks, Grandma protested to the last. And then, finally, that right-

eous minion of the law came climbing down the trailer steps again, with Grandma following him to the door.

'How do I look, Grimp?' he beamed cheerfully as Grimp stood up. 'Like you ought to wash your face sometime,' Grimp said tactlessly, for he was fast losing patience with Runny. But then his eyes widened in surprise.

Under a coating of yellowish grease, Runny's nose seemed to have returned almost to the shape it had out of hay-fever season, and his eyelids were hardly puffed at all! Instead of flaming red, those features, furthermore, now were only a delicate pink in shade. Runny, in short, was almost handsome again.

'Pretty good, eh?' he said. 'Just one shot did it. And I've only got to keep the salve on another hour. Isn't that right, Grandma?'

'That's right,' smiled Grandma from the door, clinking Runny's money gently out of one hand into the other. 'You'll be as good as new then.'

'Permanent cure, too,' said Runny. He patted Grimp benevolently on the head. 'And next week we go werret-fishing, eh, Grimp?' he added greedily.

'I guess so,' Grimp said, with a trace of coldness. It was his opinion that Runny could have been satisfied with the hay-fever cure and forgotten about the werrets.

'It's a date!' nodded Runny happily and took his greasy face whistling down the road. Grimp scowled after him, half-minded to reach for the slingshot then and there and let go with a medium stone at the lower rear of the uniform. But probably he'd better not.

'Well, that's that,' Grandma said softly.

At that moment, up at the farmhouse, a cow horn went 'Whoop-whoop!' across the valley.

'Damn,' said Grimp. 'I knew it was getting late, with him doing all that talking! Now they're calling me to supper.' There were tears of disappointment in his eyes.

'Don't let it fuss you, Grimp,' Grandma said consolingly. 'Just jump up in here a moment and close your eyes.'

Grimp jumped up into the trailer and closed his eyes expectantly.

'Put out your hands,' Grandma's voice told him.

He put out his hands, and she pushed them together to form a cup. Then something small and light and furry dropped into them, caught hold of one of Grimp's thumbs, with tiny, cool fingers, and chattered.



Grimp's eyes popped open.

'It's a lortel!' he whispered, overwhelmed.

'It's for you!' Grandma beamed.

Grimp couldn't speak. The lortel looked at him from a tiny, black, human face with large blue eyes set in it, wrapped a long, furry tail twice around his wrist, clung to this thumb with its fingers, and grinned and squeaked.

'It's wonderful!' gasped Grimp. 'Can you really teach them to talk?'

'Hello,' said the lortel.

'That's all it can say so far,' Grandma said. 'But if you're patient with it, it'll learn more.'

'I'll be patient,' Grimp promised, dazed. 'I saw one at the circus this winter, down the valley at Laggand. They said it could talk, but it never said anything while I was there.'

'Hello!' said the lortel.

'Hello!' gulped Grimp.

The cow horn whoop-whooped again.

'I guess you'd better run along to supper, or they might get mad,' said Grandma.

'I know,' said Grimp. 'What does it eat?'

'Bugs and flowers and honey and fruit and eggs, when it's wild. But you just feed it whatever you eat yourself.'

'Well, goodbye,' said Grimp. 'And golly—thanks, Grandma.'

He jumped out of the trailer. The lortel climbed out of his hand, ran up his arm and sat on his shoulder, wrapping its tail around his neck.

'It knows you already,' Grandma said, 'It won't run away.'

Grimp reached up carefully with his other hand and patted the lortel.

'I'll be back early tomorrow,' he said. 'No school. . . . They won't let me out after supper as long as those lights keep coming around.' The cow horn whooped for the third time, very loudly. This time it meant business.

'Well, goodbye,' Grimp repeated hastily. He ran off, the lortel hanging on to his shirt collar and squeaking.

Grandma looked after him and then at the sun, which had just touched the tops of the hills with its lower rim.

'Might as well have some supper myself,' she remarked, ap-

parently to no one in particular. 'But after that I'll have to run out the go-buggy and create a diversion.'

Lying on its armour-plated belly down in the meadow, the pony swung its big head around towards her. Its small yellow eyes blinked questioningly.

'What makes you think a diversion will be required?' its voice asked into her ear. The ability to produce such ventriloquial effects was one of the talents that made the pony well worth its considerable keep to Grandma.

'Weren't you listening?' she scolded. 'That policeman told me the Guardian's planning to march the village's defence unit up to the hollow after supper, and start them shooting at the Halpa detector-globes as soon as they show up.'

The pony swore an oath meaningless to anyone who hadn't been raised on the planet Treebel. It stood up, braced itself, and began pulling its feet out of the mud in a succession of loud, sucking noises.

'I haven't had an hour's straight rest since you talked me into tramping around with you eight years ago!' it complained.

'But you've certainly been seeing life, like I promised,' Grandma smiled.

The pony stopped in a last, enormous tongueful of wet weeds. 'That I have!' it said, with emphasis.

It came chewing up to the road.

'I'll keep a watch on things while you're having your supper,' it told her.

As the uniformed twelve-man defence unit marched in good order out of the village, on its way to assume a strategic position around the hollow on Grimp's father's farm, there was a sudden, small explosion not very far off.

The Guardian, who was marching in the lead with a gun over his shoulder and the slaving pank-hound on a leash, stopped short. The unit broke ranks and crowded up behind him.

'What was that?' the Guardian enquired.

Everybody glanced questioningly around the rolling green slopes of the valley, already darkened with evening shadows. The pank-hound sat down before the Guardian, pointed its nose at the even darker shadows in the woods ahead of them and growled.

'Look!' a man said, pointing in the same direction.

A spark of bright green light had appeared on their path, just where it entered the woods. The spark grew rapidly in size, became as big as a human head—then bigger! Smoky green streamers seemed to be pouring out of it....

'I'm going home right now,' someone announced at that point, sensibly enough.

'Stand your ground!' the Guardian ordered, conscious of the beginnings of a general withdrawal movement behind him. He was an old soldier. He unslung his gun, cocked it and pointed it. The pank-hound got up on his six feet and bristled.

'Stop!' the Guardian shouted at the green light.

It expanded promptly to the size of a barrel, new streamers shooting out from it and fanning about like hungry tentacles. He fired.

'Run!' everybody yelled then. The pank-hound slammed backward against the Guardian's legs, upsetting him, and streaked off after the retreating unit. The green light had spread outward jerkily into the shape of something like a many-armed, writhing starfish, almost the size of the trees about it. Deep, hooting sounds came out of it as it started drifting down the path towards the Guardian.

He got up on one knee and, in a single drumroll of sound, emptied all thirteen charges remaining in his gun into the middle of the starfish. It hooted more loudly, waved its arms more wildly, and continued to advance.

He stood up quickly then, slung the gun over his shoulder and joined the retreat. By the time the unit reached the first houses of the village, he was well up in the front ranks again. And a few minutes later, he was breathlessly organizing the local defences, employing the tactics that had shown their worth in the raids of the Laggand Bandits nine years before.

The starfish, however, was making no attempt to follow up the valley people's rout. It was still on the path at the point where the Guardian had seen it last, waving its arms about and hooting menacingly at the silent trees.

'That should do it, I guess,' Grandma Wannattel said. 'Before the first projection fizzles out, the next one in the chain will start up where they can see it from the village. It ought to be past midnight before anyone starts bothering about the globes again. Particularly

since there aren't going to be any globes around tonight—that is, if the Halpa attack-schedule has been correctly estimated.'

'I wish we were safely past midnight right now,' the rhinocetine pony worriedly informed her. Its dark shape stood a little up the road from the trailer, outlined motionlessly like a ponderous statue against the red evening sky. Its head was up; it looked as if it were listening. Which it was, in its own way—listening for any signs of activity from the hollow.

'No sense getting anxious about it,' Grandma remarked. She was perched on a rock at the side of the road, a short distance from the pony, with a small black bag slung over her shoulder. 'We'll wait here another hour till it's good and dark and then go down to the hollow. The breakthrough might begin a couple of hours after that.'

'It would have to be us again!' grumbled the pony. In spite of its size, its temperament was on the nervous side. And while any companion of Zone Agent Wannattel was bound to run regularly into situations that were far from soothing, the pony couldn't recall any previous experience that had looked as extremely unsoothing as the prospects of the night-hours ahead. On far-off Vega's world of Jeltad, in the planning offices of the Department of Galactic Zones, the decision to put Noorhut at stake to win one round in mankind's grim war with the alien and mysterious Halpa might have seemed as distressing as it was unavoidable. But the pony couldn't help feeling that the distress would have become a little more acute if Grandma's distant employers had happened to be standing right here with the two of them while the critical hours approached.

'I'd feel a lot better myself if Headquarters hadn't picked us for this particular operation,' Grandma admitted. 'Us and Noorhut....'

Because, by what was a rather singular coincidence, considering how things stood there tonight, the valley was also Grandma's home. She had been born, quite some while before, a hundred and eighty miles further inland, at the foot of the dam of the great river Wend, which had given its name to the land, and nowadays supplied it with almost all its required power.

Erisa Wannattel had done a great deal of travelling since she first became aware of the fact that her varied abilities and adventure-some nature needed a different sort of task to absorb them than could be found on Noorhut, which was progressing placidly up into the final stages of a rounded and balanced planetary civilization.

But she still liked to consider the Valley of the Wend as her home and headquarters, to which she returned as often as her work would permit. Her exact understanding of the way people there thought about things and did things also made them easy for her to manipulate; and on occasion that could be very useful.

In most other places, the means she had employed to turn the Guardian and his troop back from the hollow probably would have started a panic or brought armed ships and radiation guns zooming up for the kill within minutes. But the valley people had considered it just another local emergency. The bronze alarm bell in the village had pronounced a state of siege, and cow horns passed the word up to the outlying farms. Within minutes, the farmers were pelting down the roads to the village with their families and guns; and, very soon afterward, everything quieted down again. Guard lines had been set up by then, with the women and children quartered in the central buildings, while the armed men had settled down to watching Grandma's illusion projections—directional video narrow beams—from the discreet distance marked by the village boundaries.

If nothing else happened, the people would just stay there till morning and then start a cautious investigation. After seeing mysterious blue lights dancing harmlessly over Grimp's farm for four summers, this section of Wend was pretty well conditioned to fiery apparitions. But even if they got too adventurous, they couldn't hurt themselves on the projections, which were designed to be nothing but very effective visual displays.

What it all came to was that Grandma had everybody in the neighbourhood rounded up and immobilized where she wanted them.

In every other respect, the valley presented an exceptionally peaceful twilight scene to the eye. There was nothing to show that it was the only present point of contact between forces engaged in what was probably a war of intergalactic proportions—a war made wraith-like but doubly deadly by the circumstance that, in over a thousand years, neither side had found out much more about the other than the merciless and devastating finality of its forms of attack. There never had been any actual battles between Mankind and the Halpa, only alternate and very thorough massacres—all of

them, from Mankind's point of view, on the wrong side of the fence.

The Halpa alone had the knowledge that enabled them to reach their human adversary. That was the trouble. But, apparently, they could launch their attacks only by a supreme effort, under conditions that existed for periods of less than a score of years, and about three hundred years apart as Mankind measured time.

It was hard to find any good in them, other than the virtue of persistence. Every three hundred years, they punctually utilized that brief period to execute one more thrust, carefully prepared and placed, and carried out with a dreadfully complete abruptness, against some new point of human civilization—and this time the attack was going to come through on Noorhut.

'Something's starting to move around in that hollow!' the pony announced suddenly. 'It's not one of their globe-detectors.'

'I know,' murmured Grandma. 'That's the first of the Halpa themselves. They're going to be right on schedule, it seems. But don't get nervous. They can't hurt anything until their transmitter comes through and revives them. We've got to be particularly careful now not to frighten them off. They seem to be even more sensitive to emotional tensions in their immediate surroundings than the globes.'

The pony made no reply. It knew what was at stake and why eight big ships were circling Noorhut somewhere beyond space-detection tonight. It knew, too, that the ships would act only if it was discovered that Grandma had failed. But—

The pony shook its head uneasily. The people on Treebel had never become civilized to the point of considering the possibility of taking calculated risks on a planetary scale—not to mention the fact that the lives of the pony and of Grandma were included in the present calculation. In the eight years it had been accompanying her on her travels, it had developed a tremendous respect for Erisa Wannattel's judgement and prowess. But, just the same, frightening the Halpa off, if it still could be done, seemed like a very sound idea right now to the pony.

As a matter of fact, as Grandma well knew, it probably could have been done at this stage by tossing a small firecracker into the hollow. Until they had established their planetary foothold, the Halpa took extreme precautions. They could spot things in the class



of radiation weapons a hundred miles away, and either that or any suggestion of local aggressiveness or of long-range observation would check the invasion attempt on Noornut then and there.

But one of the principal reasons she was here tonight was to see that nothing *did* happen to stop it. For this assault would only be diverted against some other world then, and quite probably against one where the significance of the spying detector-globes wouldn't be understood before it was too late. The best information system in the Galaxy couldn't keep more than an insignificant fraction of its populations on the alert for dangers like that—

She bounced suddenly to her feet and, at the same instant, the pony swung away from the hollow toward which it had been staring. They both stood for a moment then, turning their heads about, like baffled hounds trying to fix a scent on the wind.

'It's Grimp!' Grandma exclaimed.

The rhinocerine pony snorted faintly. 'Those are his thought images, all right,' it agreed. 'He seems to feel you need protection. Can you locate him?'

'Not yet,' said Grandma anxiously. 'Yes, I can. He's coming up through the woods on the other side of the hollow, off to the left. The little devil!' She was hustling back to the trailer. 'Come on, I'll have to ride you there. I can't even dare use the go-buggy this late in the day.'

The pony crouched beside the trailer while she quickly snapped on its saddle from the top of the back steps. Six metal rings had been welded into the horny plates of its back for this purpose, so it was a simple job. Grandma clambered aloft, hanging on to the saddle's hand-rails.

'Swing wide of the hollow!' she warned. 'This could spoil everything. But make all the noise you want. The Halpa don't care about noise as such—it has to have emotional content before they get interested—and the quicker Grimp spots us, the easier it will be to find him.'

The pony already was rushing down into the meadow at an amazing rate of speed—it took a lot of very efficient muscle to drive as heavy a body as that through the gluey swamps of Treebel. It swung wide of the hollow and of what it contained, crossed a shallow bog further down the meadow with a sound like a charging torpedo-boat, and reached the woods.

It had to slow down then, to avoid brushing off Grandma.

'Grimp's down that slope somewhere,' Grandma said. 'He's heard us.'

'They're making a lot of noise!' Grimp's thought reached them suddenly and clearly. He seemed to be talking to someone. 'But we're not scared of them, are we?'

'Bang-bang!' another thought-voice came excitedly.

'It's the lortel,' Grandma and the pony said together.

'That's the stuff!' Grimp resumed approvingly. 'We'll sling-shoot them all if they don't watch out. But we'd better find Grandma soon.'

'Grimpi!' shouted Grandma. The pony backed her up with a roaring call.

'Hello?' came the lortel's thought.

'Wasn't that the pony?' asked Grimp. 'All right—let's go that way.'

'Here we come, Grimp!' Grandma shouted as the pony descended the steep side of a ravine with the straightforward technique of a rockslide.

'That's Grandma!' thought Grimp. 'Grandma!' he yelled. 'Look out! There's monsters all around!'

'What you missed!' yelled Grimp, dancing around the pony as Grandma Wannattel scrambled down from the saddle. 'There's monsters all around the village and the Guardian killed one and I slingshot another till he fizzled out and I was coming to find you—' 'Your mother will be worried!' began Grandma as they rushed into each other's arms.

'No,' grinned Grimp. 'All the kids are supposed to be sleeping in the schoolhouse and she won't look there till morning and the schoolteacher said the monsters were all'—he slowed down cautiously—'ho-lucy-nations. But he wouldn't go look when the Guardian said they'd show him one. He stayed right in bed. But the Guardian's all right—he killed one and I slingshot another and the lortel learned a new word. Say "bang-bang", lortel!' he invited. 'Hello!' squeaked the lortel.

'Aw,' said Grimp disappointedly. 'He can say it, though. And I've come to take you to the village so the monsters don't get you. Hello, pony!'

'Bang-bang,' said the lortel, distinctly.

'See?' cried Grimp. 'He isn't scared at all—he's a real brave lortel!'

If we see some monsters don't you get scared either, because I've got my slingshot,' he said, waving it bloodthirstily, 'and two back pockets still full of medium stones. The way to do it is to kill them all!'

'It sounds like a pretty good idea. Grimp,' Grandma agreed. 'But you're awfully tired now.'

'No, I'm not!' Grimp said surprised. His right eye sagged shut and then his left; and he opened them both with an effort and looked at Grandma.

'That's right,' he admitted. 'I am . . .'

'In fact,' said Grandma, 'you're asleep!'

'No, I'm no—' objected Grimp. Then he sagged towards the ground, and Grandma caught him.

'In a way I hate to do it,' she panted, wrestling him aboard the pony which had lain down and flattened itself as much as it could to make it easier. 'He'd probably enjoy it. But we can't take a chance. He's a husky little devil, too,' she groaned, giving a final boost, 'and those ammunition pockets don't make him any lighter!' She clambered up again herself and noticed that the lortel had transferred itself to her coat collar.

The pony stood up cautiously.

'Now what?' it said.

'Might as well go straight to the hollow,' said Grandma, breathing hard. 'We'll probably have to wait around there a few hours, but if we're careful it won't do any harm.'

'Did you find a good deep pond?' Grandma asked the pony a little later, as it came squishing up softly through the meadow behind her to join her at the edge of the hollow.

'Yes,' said the pony. 'About a hundred yards back. That should be close enough. How much more waiting do you think we'll have to do?'

Grandma shrugged carefully. She was sitting in the grass with what, by daylight, would have been a good view of the hollow below. Grimp was asleep with his head on her knees; and the lortel, after catching a few bugs in the grass and eating them, had settled down on her shoulder and dozed off too.

'I don't know,' she said. 'It's still three hours till Big Moonrise, and it's bound to be some time before then. Now you've found a

waterhole, we'll just stay here together and wait. The one thing to remember is not to let yourself start getting excited about them.'

The pony stood huge and chunky beside her, its forefeet on the edge of the hollow, staring down. Muddy water trickled from its knobby flanks. It had brought the warm mud-smells of a summer pond back with it to hang in a cloud about them.

There was vague, dark, continuous motion at the bottom of the hollow. A barely noticeable stirring in the single big pool of darkness that filled it.

'If I were alone,' the pony said, 'I'd get out of here! I know when I ought to be scared. But you've taken psychological control of my reactions, haven't you?'

'Yes,' said Grandma. 'It'll be easier for me, though, if you help along as much as you can. There's really no danger until their transmitter has come through.'

'Unless,' said the pony, 'they've worked out some brand-new tricks in the past few hundred years.'

'There's that,' Grandma admitted. 'But they've never tried changing their tricks on us yet. If it were us doing the attacking, we'd vary our methods each time, as much as we could. But the Halpa don't seem to think just like we do about anything. They wouldn't still be so careful if they didn't realize they were very vulnerable at this point.'

'I hope they're right about that!' the pony said briefly.

Its head moved then, following the motion of something that sailed flutteringly out of the depths of the hollow, circled along its far rim, and descended again. The inhabitants of Treebel had a much deeper range of dark-vision than Grandma Wannattel, but she was also aware of that shape.

'They're not much to look at,' the pony remarked. 'Like a big, dark rag of leather, mostly.'

'Their physical structure is believed to be quite simple,' Grandma agreed slowly. The pony was tensing up again, and it was best to go on talking to it, about almost anything at all. That always helped, even though the pony knew her much too well by now to be really fooled by such tricks.

'Many very efficient life-forms aren't physically complicated, you know,' she went on, letting the sound of her voice ripple steadily into its mind. 'Parasitical types, particularly. It's pretty certain, too, that the Halpa have the hive-mind class of intelligence, so

what goes for the nerve-systems of most of the ones they send through to us might be nothing much more than secondary reflex-transmitters....

Grimp stirred in his sleep at that point and grumbled. Grandma looked down at him. 'You're sound asleep!' she told him severely, and he was again.

'You've got plans for that boy, haven't you?' the pony said, without shifting its gaze from the hollow.

'I've had my eye on him,' Grandma admitted, 'and I've already recommended him to Headquarters for observation. But I'm not going to make up my mind about Grimp till next summer, when we've had more time to study him. Meanwhile, we'll see what he picks up naturally from the lortel in the way of telepathic communication and sensory extensions. I think Grimp's the kind we can use.'

'He's all right,' the pony agreed absently. 'A bit murderous, though, like most of you....'

'He'll grow out of it!' Grandma said, a little annoyed, for the subject of human aggressiveness was one she and the pony argued about frequently. 'You can't hurry developments like that along too much. All of Noorhut should grow out of that stage, as a people, in another few hundred years. They're about at the turning-point right now—'

Their heads came up together, then, as something very much like a big, dark rag of leather came fluttering up from the hollow and hung in the dark air above them. The representatives of the opposing powers that were meeting on Noorhut that night took quiet stock of one another for a moment.

The Halpa was about six foot long and two wide, and considerably less than an inch thick. It held its position in the air with a steady, rippling motion, like a bat the size of a man. Then, suddenly, it extended itself with a snap, growing taut as a curved sail.

The pony snorted involuntarily. The apparently featureless shape in the air turned towards it and drifted a few inches closer. When nothing more happened, it turned again and fluttered quietly back down into the hollow.

'Could it tell I was scared?' the pony asked uneasily.

'You reacted just right,' Grandma said soothingly. 'Startled suspicion at first, and then just curiosity, and then another start when

it made that jump. It's about what they'd expect from creatures that would be hanging around the hollow now. We're like cows to them. They can't tell what things are by their looks, like we do—'

But her tone was thoughtful, and she was more shaken than she would have cared to let the pony notice. There had been something indescribably menacing and self-assured in the Halpa's gesture. Almost certainly, it had only been trying to draw a reaction of hostile intelligence from them, probing, perhaps, for the presence of weapons that might be dangerous to its kind.

But there was a chance—a tiny but appalling chance—that the things *had* developed some drastically new form of attack since their last break-through, and that they already were in control of the situation....

In which case, neither Grimp nor anyone else on Noorhut would be doing any more growing-up after tomorrow.

Each of the eleven hundred and seventeen planets that had been lost to the Halpa so far still traced a fiery, forbidding orbit through space—torn back from the invaders only at the cost of depriving it, by humanity's own weapons, of the conditions any known form of life could tolerate.

The possibility that this might also be Noorhut's future had loomed as an ugly enormity before her for the past four years. But of the nearly half a hundred worlds which the Halpa were found to be investigating through their detector-globes as possible invasion points for this period, Noorhut finally had been selected by Headquarters as the one where local conditions were most suited to meet them successfully. And that meant in a manner which must include the destruction of their only real invasion weapon, the fabulous and mysterious Halpa transmitter. Capable as they undoubtedly were, they had shown in the past that they were able or willing to employ only one of those instruments for each period of attack. Destroying the transmitter meant therefore that humanity would gain a few more centuries to figure out a way to get back at the Halpa before a new attempt was made.

So on all planets but Noorhut the detector-globes had been encouraged carefully to send back reports of a dangerously alert and well-armed population. On Noorhut, however, they had been soothed along... and just as her home-planet had been chosen as the most favourable point of encounter, so was Erisa Wannattel

herself selected as the agent most suited to represent humanity's forces under the conditions that existed there.

Grandma sighed gently and reminded herself again that Headquarters was as unlikely to miscalculate the overall probability of success as it was to select the wrong person to achieve it. There was only the tiniest, the most theoretical, of chances that something might go wrong and that she would end her long career with the blundering murder of her own home-world.

But there was that chance.

'There seem to be more down there every minute!' the pony was saying.

Grandma drew a deep breath.

'Must be several thousand by now,' she acknowledged. 'It's getting near breakthrough time, all right, but those are only the advance forces.' She added, 'Do you notice anything like a glow of light down there, towards the centre?'

The pony stared a moment. 'Yes,' it said. 'But I would have thought that was way under the red for you. Can you see it?'

'No,' said Grandma. 'I get a kind of a feeling, like heat. That's the transmitter beginning to come through. I think we've got them!'

The pony shifted its bulk slowly from side to side.

'Yes,' it said resignedly, 'or they've got us.'

'Don't think about that,' Grandma ordered sharply and clamped one more mental lock shut on the foggy, dark terrors that were curling and writhing under her conscious thoughts, threatening to emerge at the last moment and paralyse her actions.

She had opened her black bag and was unhurriedly fitting together something composed of a few pieces of wood and wire, and a rather heavy, stiff spring....

'Just be ready,' she added.

'I've been ready for an hour,' said the pony, shuffling its feet unhappily.

They did no more talking after that. All the valley had become quiet about them. But slowly the hollow below was filling up with a black, stirring, slithering tide. Bits of it fluttered up now and then like strips of black smoke, hovered a few yards above the mass and settled again.

Suddenly, down in the centre of the hollow, there was something else.

The pony had seen it first, Grandma Wannattel realized. It was staring in that direction for almost a minute before she grew able to distinguish something that might have been a group of graceful miniature spires. Semi-transparent in the darkness, four small domes showed at the corners, with a larger one in the centre. The central one was about twenty feet high and very slender.

The whole structure began to solidify swiftly....

The Halpa Transmitter's appearance of crystalline slightness was perhaps the most mind-chilling thing about it. For it brought instantly a jarring sense of what must be black distance beyond all distances, reaching back unimaginably to its place of origin. In that unknown somewhere, a prodigiously talented and determined race of beings had laboured for human centuries to prepare and point some stupendous gun... and were able then to bridge the vast interval with nothing more substantial than this dark sliver of glass that had come to rest suddenly in the valley of the Wend.

But, of course, the Transmitter was all that was needed; its deadly poison lay in a sluggish, almost inert mass about it. Within minutes from now, it would waken to life, as similar transmitters had wakened on other nights on those lost and burning worlds. And in much less than minutes after that, the Halpa invaders would be hurled by their slender machine to every surface section of Noorhut—no longer inert, but quickened into a ravaging, almost indestructible form of vampiric life, dividing and sub-dividing in its incredibly swift cycle of reproduction, fastening to feed anew, growing and dividing again—

Spreading, at that stage, much more swiftly than it could be exterminated by anything but the ultimate weapons!

The pony stirred suddenly, and she felt the wave of panic roll up in it.

'It's the Transmitter, all right,' Grandma's thought reached it quickly. 'We've had two descriptions of it before. But we can't be sure it's *here* until it begins to charge itself. Then it lights up—first at the edges, and then at the centre. Five seconds after the central spire lights up, it will be energized too much to let them pull it back again. At least, they couldn't pull it back after that, the last time they were observed. And then we'd better be ready—'

The pony had been told all that before. But as it listened it was quieting down again.

'And you're going to go on sleeping!' Grandma Wannattel's thought told Grimp next. 'No matter what you hear or what happens, you'll sleep on and know nothing at all any more until I wake you up...'

Light surged up suddenly in the Transmitter—first into the four outer spires, and an instant later into the big central one, in a sullen red glow. It lit the hollow with a smoky glare. The pony took two startled steps backwards.

'Five seconds to go!' whispered Grandma's thought. She reached into her black bag again and took out a small plastic ball. It reflected the light from the hollow in dull crimson gleamings. She let it slip down carefully inside the shaftlike frame of the gadget she had put together of wood and wire. It clicked into place there against one end of the compressed spring.

Down below, they lay now in a blanket fifteen feet thick over the wet ground, like big, black, water-sogged leaves swept up in circular piles about the edges of the hollow. The tops and sides of the piles were stirring and shivering and beginning to slide down towards the Transmitter.

'...five, and go!' Grandma said aloud. She raised the wooden catapult to her shoulder.

The pony shook its blunt-horned head violently from side to side, made a strangled, bawling sound, surged forward and plunged down the steep side of the hollow in a thundering rush. Grandma aimed carefully and let go.

The blanket of dead-leaf things was lifting into the air ahead of the pony's ground-shaking approach in a weightless, silent swirl of darkness which instantly blotted both the glowing Transmitter and the pony's shape from sight. The pony roared once as the blackness closed over it. A second later, there was a crash like the shattering of a hundred-foot mirror—and at approximately the same moment, Grandma's plastic ball exploded somewhere in the centre of the swirling swarm.

Cascading fountains of white fire filled the whole of the hollow. Within the fire, a dense mass of shapes fluttered and writhed frenziedly like burning rags. From down where the fire boiled fiercest rose continued sounds of brittle substances suffering enormous violence. The pony was trampling the ruined Transmitter, making sure of its destruction.

'Better get out of it!' Grandma shouted anxiously. 'What's left of that will all melt now anyway!'

She didn't know whether it heard her or not. But a few seconds later, it came pounding up the side of the hollow again. Blazing from nose to rump, it tramped past Grandma, plunged through the meadow behind her, shedding white sheets of fire that exploded the marsh grass in its tracks, and hurled itself headlong into the pond it had selected previously. There was a great splash, accompanied by sharp hissing noises. Pond and pony vanished together under billowing clouds of steam.

'That was pretty hot!' its thought came to Grandma.

She drew a deep breath.

'Hot as anything that ever came out of a volcano!' she affirmed. 'If you'd played around in it much longer, you'd have fixed up the village with roasts for a year.'

'I'll just stay here for a while, till I've cooled off a bit,' said the pony.

Grandma found something strangling her then, and discovered it was the lortel's tail. She unwound it carefully. But the lortel promptly reanchored itself with all four hands in her hair. She decided to leave it there. It seemed badly upset.

Grimp, however, slept on. It was going to take a little manoeuvring to get him back into the village undetected before morning, but she would figure that out by and by. A steady flow of cool night-air was being drawn past them into the hollow now and rising out of it again in boiling, vertical columns of invisible heat. At the bottom of the deluge blaze she'd lit down there, things still seemed to be moving about—but very slowly. The Halpa were tough organisms, all right, though not nearly so tough, when you heated them up with a really good incendiary, as were the natives of Treebel.

She would have to make a final check of the hollow around dawn, of course, when the ground should have cooled off enough to permit it—but her century's phase of the Halpa War did seem to be over. The defensive part of it, at any rate—

Wet, munching sounds from the pond indicated the pony felt comfortable enough by now to take an interest in the parboiled vegetation it found floating around it. Everything had turned out all right.

So she settled down carefully on her back in the long marsh grass



without disturbing Grimp's position too much, and just let herself faint for a while.

By sunrise, Grandma Wannattel's patent-medicine trailer was nine miles from the village and rolling steadily southwards up the valley road through the woods. As usual, she was departing under a cloud.

Grimp and the policeman had showed up early to warn her. The Guardian was making use of the night's various unprecedented disturbances to press through a vote on a Public Menace charge against Grandima in the village; and since everybody still felt rather excited and upset, he had a good chance just now of getting a majority.

Grimp had accompanied her far enough to explain that this state of affairs wasn't going to be permanent. He had it all worked out.

Runny's new immunity to hay-fever had brought him and the pretty Vellit to a fresh understanding overnight; they were going to get married five weeks from now. As a married man, Runny would then be eligible for the post of Village Guardian at the harvest elections—and between Grimp's cousins and Vellit's cousins, Runny's backers would just about control the vote. So when Grandma got around to visiting the valley again next summer, she needn't worry any more about police interference or official disapproval. . . .

Grandma had nodded approvingly. That was about the kind of neighborhood politics she'd begun to play herself at Grimp's age. She was pretty sure by now that Grimp was the one who eventually would become her successor, and the guardian not only of Noorhut and the star-system to which Noorhut belonged, but of a good many other star-systems besides. With careful schooling, he ought to be just about ready for the job by the time she was willing, finally, to retire.

An hour after he had started back to the farm, looking suddenly a little forlorn, the trailer swung off the valley road into a narrow forest path. Here the pony lengthened its stride, and less than five minutes later they entered a curving ravine, at the far end of which lay something that Grimp would have recognized instantly, from his one visit to the nearest port city, as a small spaceship.

A large round lock opened soundlessly in its side as they approached. The pony came to a stop. Grandma got down from the

driver's seat and unhitched it. The pony walked into the lock, and the trailer picked its wheels off the ground and floated in after it. Grandma Wannattel walked in last, and the lock closed quietly on her heels.

The ship lay still a moment longer. Then it was suddenly gone. Dead leaves went dancing for a while about the ravine, disturbed by the breeze of its departure.

In a place very far away—so far that neither Grimp nor his parents nor anyone in the village except the schoolteacher had ever heard of it—a set of instruments began signalling for attention. Somebody answered them.

Grandma's voice announced distinctly:

'This is Zone Agent Wannattel's report on the successful conclusion of the Halpa operation on Noorhut—'

High above Noorhut's skies, eight great ships swung instantly out of their watchful orbits about the planet and flashed off again into the blackness of the boundless space that was their sea and their home.

around. To the box he said: "Police chief," and then to the police chief: "There's been a homicide committed with Medical Instrument Kit 674101. It was lost some months ago by one of my people, Dr. John Hemingway. He didn't have a clear account of the circumstances."

The police chief groaned and said: "I'll call him in and question him." He was to be astonished by the answers, and was to learn that the homicide was well out of his jurisdiction.

Al stood for a moment at the bag board by the glowing red light that had been sparked into life by a departing vital force giving, as its last act, the warning that Kit 674101 was in homicidal hands. With a sigh, Al pulled the plug and the light went out.

"Yah," jeered the woman. "You'd fool around with my neck, but you wouldn't risk your own with that thing!"

Angie smiled with serene confidence a smile that was to shock hardened morgue attendants. She set the Cutaneous Series knife to three centimeters before drawing it across her neck. Smiling, knowing the blade would cut only the dead horny tissue of the epidermis and the live tissue of the dermis, mysteriously push aside all major and minor blood vessels and muscular tissue—

Smiling, the knife plunging in and its microtomesharp metal shearing through major and minor blood vessels and muscular tissue and pharynx, Angie cut her throat.

In the few minutes it took the police, summoned by the shrieking Mrs. Coleman, to arrive, the instruments had become crusted with rust, and the flasks which had held vascular glue and clumps of pink, rubbery alveoli and spare gray cells and coils of receptor nerves held only black slime, and from them when opened gushed the foul gases of decomposition.

## BORN OF MAN AND WOMAN

by *Richard Matheson*

X—This day when it had light mother called me retch. You retch she said. I saw in her eyes the anger. I wonder what it is a retch.

This day it had water falling from upstairs. It fell all around. I saw that. The ground of the back I watched from the little window. The ground it sucked up the water like thirsty lips. It drank too much and it got sick and runny brown. I didnt like it.

Mother is a pretty I know. In my bed place with cold walls around I have a paper things that was behind the furnace. It says on it SCREEN-STARS. I see in the pictures faces like of mother and father. Father says they are pretty. Once he said it.

And also mother he said. Mother so pretty and me decent enough. Look at you he said and didnt have the nice face. I touched his arm and said it is alright father. He shook and pulled away where I couldnt reach.

Today mother let me off the chain a little so I could look out the little window. Thats how I saw the water falling from upstairs.

XX—This day it had goldness in the upstairs. As I know when I looked at it my eyes hurt. After I look at it the cellar is red.

I think this was church. They leave the upstairs. The big machine swallows them and rolls out past and is gone. In the back part is the little mother. She is much small than me. I am I can see out the little window all I like.

In this day when it got dark I had eat my food and some bugs. I hear laughs upstairs. I like to know why there are laughs for. I took the chain

from the wall and wrapped it around me. I walked squish to the stairs. They creak when I walk on them. My legs slip on them because I don't walk on stairs. My feet stick to the wood.

I went up and opened a door. It was a white place. White as white jewels that come from upstairs sometime. I went in and stood quiet. I hear the laughing some more. I talk to the sound and look through to the people. More people than I thought was. I thought I should laugh with them.

Mother came out and pushed the door in. It hit me and hurt. I fell back on the smooth floor and the chain made noise. I cried. She made a hissing noise into her and put her hand on her mouth. Her eyes got big.

She looked at me. I heard father call. What fell he called. She said a iron board. Come help pick it up she said. He came and said now is that so heavy you need. He saw me and grew big. The anger came in his eyes. He hit me. I spilled some of the drip on the floor from one arm. It was not nice. It made ugly green on the floor.

Father told me to go to the cellar. I had to go. The light it hurt some now in my eyes. It is not so like that in the cellar.

Father tied my legs and arms up. He put me on my bed. Upstairs I heard laughing while I was quiet there looking on a black spider that was swinging down to me. I thought what father said. Ohgod he said. And only eight.

XXX—This day father hit in the chain again before it had light. I have to try pull it out again. He said I was bad to come upstairs. He said never do that again or he would beat me hard. That hurts.

I hurt. I slept the day and rested my head against the cold wall. I thought of the white place upstairs.

XXXX—I got the chain from the wall out. Mother was upstairs. I heard little laughs very high. I looked out the window. I saw all little people like the little mother and little fathers too. They are pretty.

They were making nice noise and jumping around the ground. Their legs was moving hard. They are like mother and father. Mother says all right people look like they do.

One of the little fathers saw me. He pointed at the window. I let go and slid down the wall in the dark. I curled up as they would not see. I heard their talks by the window and foots running. Upstairs there was a door hitting. I heard the little mother call upstairs. I heard heavy steps and I rushed in my bed place. I hit the chain in the wall and lay down on my front.

I heard mother come down. Have you been at the window she said. I heard the anger. Stay away from the window. You have pulled the chain out again.

She took the stick and hit me with it. I didnt cry. I cant do that. But the drip ran all over the bed. She saw it and twisted away and made a noise. Oh mygodmygod she said why have you done this to me? I heard the stick go bounce on the stone floor. She ran upstairs. I slept the day.

XXXXX—This day it had water again. When mother was upstairs I heard the little one come slow down the steps. I hidded myself in the coal bin for mother would have anger if the little mother saw me.

She had a little live thing with her. It walked on the arms and had pointy ears. She said things to it.

It was all right except the live thing smelled me. It ran up the coal and looked down at me. The hairs stood up. In the throat it made an angry noise. I hissed but it jumped on me.

I didnt want to hurt it. I got fear because it bit me harder than the rat does. I hurt and the little mother screamed. I grabbed the live thing tight. It made sounds I never heard. I pushed it all together. It was all lumpy and red on the black coal.

I hid there when mother called. I was afraid of the stick. She left. I crept over the coal with the thing. I hid it under my pillow and rested on it. I put the chain in the wall again.

X—This is another times. Father chained me tight. I hurt because he beat me. This time I hit the stick out of his hands and made noise. He went away and his face was white. He ran out of my bed place and locked the door.

I am not so glad. All day it is cold in here. The chain comes slow out of the wall. And I have a bad anger with mother and father. I will show them. I will do what I did that once.

I will screech and laugh loud. I will run on the walls. Last I will hang head down by all my legs and laugh and drip green all over until they are sorry they didnt be nice to me.

If they try to beat me again I'll hurt them. I will.



## SECOND DAWN

ARTHUR C. CLARKE

'Here they come,' said Eris, rising to his forefeet and turning to look down the long valley. For a moment the pain and bitterness had left his thoughts, so that even Jeryl, whose mind was more closely tuned to his than to any other, could scarcely detect it. There was even an undertone of softness that recalled poignantly the Eris she had known in the days before the War—the old Eris who now seemed almost as remote and as lost as if he were lying with all the others out there on the plain.

A dark tide was flowing up the valley, advancing with a curious, hesitant motion, making odd pauses and little bounds forward. It was flanked with gold—the thin line of the Atheleni guards, so terrifyingly few compared with the black mass of the prisoners. But they were enough: indeed, they were only needed to guide that aimless river on its faltering way. Yet at the sight of so many thousands of the enemy, Jeryl found herself trembling and instinctively moved towards her mate, silver pelt resting against gold. Eris gave no sign that he had understood or even noticed the action.

The fear vanished as Jeryl saw how slowly the dark flood was moving forwards. She had been told what to expect, but the reality was even worse than she had imagined. As the prisoners came nearer, all the hate and bitterness ebbed from her mind, to be replaced by a sick compassion. No one of her race need ever more fear the aimless, idiot horde that was being shepherded through the pass into the valley it would never leave again.

The guards were doing little more than urge the prisoners on with meaningless but encouraging cries, like nurses calling to infants too young to sense their thoughts. Strain as she might, Jeryl could detect no vestige of reason in any of these thousands of minds passing so near at hand. That brought home to her, more vividly than could anything else, the magnitude of the victory—and of the defeat. Her mind was sensitive enough to detect the first faint

thoughts of children, hovering on the verge of consciousness. The defeated enemy had become not even children, but babies with the bodies of adults.

The tide was passing within a few feet of them now. For the first time, Jeryl realized how much larger than her own people the Mithraneans were, and how beautifully the light of the twin suns gleamed on the dark satin of their bodies. Once a magnificent specimen, towering a full head above Eris, broke loose from the main body and came blundering towards them, halting a few paces away. Then it crouched down like a lost and frightened child, the splendid head moving uncertainly from side to side as if seeking it knew not what. For a moment the great, empty eyes fell full upon Jeryl's face. She was as beautiful, she knew, to the Mithraneans as to her own race—but there was no flicker of emotion on the blank features, and no pause in the aimless movement of the questing head. Then an exasperated guard drove the prisoner back to his fellows.

'Come away,' Jeryl pleaded. 'I don't want to see any more. Why did you ever bring me here?' The last thought was heavy with approach.

Eris began to move away over the grassy slopes in great bounds that she could not hope to match, but as he went his mind threw its message back to hers. His thoughts were still gentle, though the pain beneath them was too deep to be concealed.

'I wanted everyone—even you—to see what we had to do to win the War. Then, perhaps, we will have no more in our lifetimes.'

He was waiting for her on the brow of the hill, undistressed by the mad violence of his climb. The stream of prisoners was now too far below for them to see the details of its painful progress. Jeryl crouched down beside Eris and began to browse on the sparse vegetation that had been exiled from the fertile valley. She was slowly beginning to recover from the shock.

'But what will happen to them?' she asked presently, still haunted by the memory of that splendid, mindless giant going into a captivity it could never understand.

'They can be taught how to eat,' said Eris. 'There is food in the valley for half a year, and then we'll move them on. It will be a heavy strain on our own resources, but we're under a moral obligation—and we've put it in the peace treaty.'

'They can never be cured?'

'No. Their minds have been totally destroyed. They'll be like this until they die.'

There was a long silence. Jeryl let her gaze wander across the hills, falling in gentle undulations to the edge of the ocean. She could just make out, beyond a gap in the hills, the distant line of blue that marked the sea—the mysterious, impassable sea. Its blue would soon be deepening into darkness, for the fierce white sun was setting and presently there would only be the red disc—hundreds of times larger but giving far less light—of its pale companion.

'I suppose we had to do it,' Jeryl said at last. She was thinking almost to herself, but she let enough of her thoughts escape for Eris to overhear.

'You've seen them,' he answered briefly. 'They were bigger and stronger than we. Though we outnumbered them, it was stalemate: in the end, I think they would have won. By doing what we did, we saved thousands from death—or mutilation.'

The bitterness came back into his thoughts, and Jeryl dared not look at him. He had screened the depths of his mind, but she knew that he was thinking of the shattered ivory stump upon his forehead. The War had been fought, except at the very end, with two weapons only—the razor-sharp hooves of the little, almost useless forepaws, and the unicornlike horns. With one of these Eris could never fight again, and from the loss stemmed much of the embittered harshness that sometimes made him hurt even those who loved him.

Eris was waiting for someone, though who it was Jeryl could not guess. She knew better than to interrupt his thoughts while he was in his present mood, and so remained silently beside him, her shadow merging with his as it stretched far along the hilltop.

Jeryl and Eris came of a race which, in Nature's lottery, had been luckier than most—and yet had missed one of the greatest prizes of all. They had powerful bodies and powerful minds, and they lived in a world which was both temperate and fertile. By human standards, they would have seemed strange but by no means repulsive. Their sleek, fur-covered bodies tapered to a single giant rear limb that could send them leaping over the ground in thirty-foot bounds. The two forelimbs were much smaller, and served merely for support and steadying. They ended in pointed hooves that could be deadly in combat, but had no other useful purpose.

Both the Atheleni and their cousins, the Mithraneans, possessed mental powers that had enabled them to develop a very advanced mathematics and philosophy: but over the physical world they had no control at all. Houses, tools, clothes—indeed, artefacts of any kind—were utterly unknown to them. To races which possessed hands, tentacles, or other means of manipulation, their culture would have seemed incredibly limited: yet such is the adaptability of the mind, and the power of the commonplace, that they seldom realized their handicaps and could imagine no other way of life. It was natural to wander in great herds over the fertile plains, pausing where food was plentiful and moving on again when it was exhausted. This nomadic life had given them enough leisure for philosophy and even for certain arts. Their telepathic powers had not yet robbed them of their voices and they had developed a complex vocal music and an even more complex choreography. But they took the greatest pride of all in the range of their thoughts: for thousands of generations they had sent their minds roving through the misty infinities of metaphysics. Of *physics*, and indeed of all the sciences of matter, they knew nothing—not even that they existed. 'Someone's coming,' said Jeryl suddenly. 'Who is it?' Eris did not bother to look, but there was a sense of strain in his reply.

'It's Aretenon. I agreed to meet him here.'

'I'm so glad. You were such good friends once—it upset me when you quarrelled.'

Eris pawed fretfully at the turf, as he did when he was embarrassed or annoyed.

'I lost my temper with him when he left me during the fifth battle of the Plain. Of course I didn't know then why he had to go.'

Jeryl's eyes widened in sudden amazement and understanding.

'You mean—he had something to do with the Madness, and the way the War ended?'

'Yes. There were very few people who knew more about the mind than he did. I don't know what part he played, but it must have been an important one. I don't suppose he'll ever be able to tell us much about it.'

Still a considerable distance below them, Aretenon was zigzagging up the hillside in great leaps. A little later he had reached them and instinctively bent his head to touch horns with Eris in the universal gesture of greeting. Then he stopped, horribly em-

barrassed, and there was an awkward pause until Jeryl came to the rescue with some conventional remarks.

When Eris spoke, Jeryl was relieved to sense his obvious pleasure at meeting his friend once again, for the first time since their angry parting at the height of the War. It had been longer still since her last meeting with Aretenon, and she was surprised to see how much he had changed. He was considerably younger than Eris—but no one would have guessed it now. Some of his once-golden peit was turning black with age, and with a flash of his old humour Eris remarked that soon no one would be able to tell him from a Mithraean.

Aretenon smiled.

'That would have been useful in the last few weeks. I've just come through their country, helping to round up the Wanderers. We weren't very popular, as you might expect. If they'd known who I was, I don't suppose I'd have got back alive—armistice or no armistice.'

'You weren't actually in charge of the Madness, were you?' asked Jeryl, unable to control her curiosity.

She had a momentary impression of thick, defensive mists forming around Aretenon's mind, shielding all his thoughts from the outer world. Then the reply came, curiously muffled, and with a sense of distance that was very rare in telepathic-contact.

'No: I wasn't in supreme charge. But there were only two others between myself and—the top.'

'Of course,' said Eris, rather petulantly, 'I'm only an ordinary soldier and don't understand these things. But I'd like to know just how you did it. Naturally,' he added, 'neither Jeryl nor myself would talk to anyone else.'

Again that veil seemed to descend over Aretenon's thoughts. Then it lifted, ever so slightly.

'There's very little I'm allowed to tell. As you know, Eris, I was always interested in the mind and its workings. Do you remember the games we used to play, when I tried to uncover your thoughts, and you did your best to stop me? And how I sometimes made you carry out acts against your will?'

'I still think,' said Eris, 'that you couldn't have done that to a stranger, and that I was really unconsciously co-operating.'

'That was true then—but it isn't any longer. The proof lies down there in the valley.' He gestured towards the last stragglers who

were being rounded up by the guards. The dark tide had almost passed, and soon the entrance to the valley would be closed.

'When I grew older,' continued Aretenon, 'I spent more and more of my time probing into the ways of the mind, and trying to discover why some of us can share our thoughts so easily, while others can never do so but must remain always isolated and alone, forced to communicate by sounds or gestures. And I became fascinated by those rare minds that are completely deranged, so that those who possess them seem less than children.'

'I had to abandon these studies when the War began. Then, as you know, they called for me one day during the fifth battle. Even now, I'm not quite sure who was responsible for that. I was taken to a place a long way from here, where I found a little group of thinkers many of whom I already knew.'

'The plan was simple—and tremendous. From the dawn of our race we've known that two or three minds, linked together, could be used to control another mind, *if it was willing*, in the way that I used to control you. We've employed this power for healing since ancient times. Now we planned to use it for destruction.'

'There were two main difficulties. One was bound up with that curious limitation of our normal telepathic powers—the fact that, except in rare cases, we can only have contact over a distance *with someone we already know*, and can communicate with strangers only when we are actually in their presence.'

'The second, and greater problem, was that the massed power of many minds would be needed, and never before had it been possible to link together more than two or three. How we succeeded is our main secret: like all things, it seems easy now it has been done. And once we had started, it was simpler than we had expected. Two minds are more than twice as powerful as one, and three are much more than thrice as powerful as a single will. The exact mathematical relationship is an interesting one. You know how very rapidly the number of ways a group of objects may be arranged increases with the size of the group? Well, a similar relationship holds in this case.'

'So in the end we had our Composite Mind. At first it was unstable, and we could hold it together only for a few seconds. It's still a tremendous strain on our mental resources, and even now we can only do it for—well, for long enough.'

'All these experiments, of course, were carried out in great

secretcy. If we could do this, so could the Mithraneans, for their minds are as good as ours. We had a number of their prisoners, and we used them as subjects.'

For a moment the veil that hid Aretenon's inner thoughts seemed to tremble and dissolve: then he regained control.

'That was the worst part. It was bad enough to send madness into a far land, but it was infinitely worse when you could watch with your own eyes the effects of what you did.'

'When we had perfected our technique, we made the first long-distance test. Our victim was someone so well known to one of our prisoners—whose mind we had taken over—that we could identify him completely and thus the distance between us was no objection. The experiment worked, but of course no one suspected that we were responsible.'

'We did not operate again until we were certain that our attack would be so overwhelming that it would end the War. From the minds of our prisoners we had identified about a score of Mithraneans—their friends and kindred—in such detail that we could pick them out and destroy them. As each mind fell beneath our attack, it gave up to us the knowledge of others, and so our power increased. We could have done far more damage than we did, for we took only the males.'

'Was that,' said Jeryl bitterly, 'so very merciful?'

'Perhaps not: but it should be remembered to our credit. We stopped as soon as the enemy sued for peace, and as we alone knew what had happened, we went into their country to undo what damage we could. It was little enough.'

There was a long silence. The valley was deserted now, and the white sun had set. A cold wind was blowing over the hills, passing, where none could follow it, out across the empty and untravelled sea. Then Eris spoke, his thoughts almost whispering in Aretenon's mind.

'You did not come to tell me this, did you? There is something more.' It was a statement rather than a query.

'Yes,' replied Aretenon. 'I have a message for you—one that will surprise you a good deal. It's from Therodimus.'

'Therodimus! I thought—'

'You thought he was dead, or worse still, a traitor. He's neither, although he's lived in enemy territory for the last twenty years. The Mithraneans treated him as we did, and gave him everything he

needed. They recognized his mind for what it was, and even during the War no one touched him. Now he wants to see you again.'

Whatever emotions Eris was feeling at this news of his old teacher, he gave no sign of them. Perhaps he was recalling his youth, remembering now that Therodimus had played a greater part in the shaping of his mind than any other single influence. But his thoughts were barred to Aretenon and even to Jeryl.

'What's he been doing all this time?' Eris asked at length. 'And why does he want to see me now?'

'It's a long and complicated story,' said Aretenon, 'but Therodimus has made a discovery quite as remarkable as ours, and one that may have even greater consequences.'

'Discovery? What sort of discovery?'

Aretenon paused, looking thoughtfully along the valley. The guards were returning, leaving behind only the few who would be needed to deal with any wandering prisoners.

'You know as much of our history as I do, Eris,' he began. 'It took, we believe, something like a million generations for us to reach our present level of development—and that's a tremendous length of time! Almost all the progress we've made has been due to our telepathic powers: without them we'd be little different from all those other animals that show such puzzling resemblances to us. We're very proud of our philosophy and our mathematics, of our music and dancing—but have you ever thought, Eris, that there might be other lines of cultural development which we've never even dreamed of? *That there might be other forces in the Universe beside mental ones?*'

'I don't know what you mean,' said Eris flatly.

'It's hard to explain, and I won't try—except to say this. Do you realize just how pitifully feeble is our control over the external world, and how useless these limbs of ours really are? No—you can't, for you won't have seen what I have. But perhaps this will make you understand.'

The pattern of Aretenon's thoughts modulated suddenly into a minor key.

'I remember once coming upon a bank of beautiful and curiously complicated flowers. I wanted to see what they were like inside, so I tried to open one, steadying it between my hooves and picking it apart with my teeth. I tried again and again—and failed. In the end, half mad with rage, I trampled all those flowers into the dirt.'

Jeryl could detect the perplexity in Eris's mind, but she could see that he was interested and curious to know more.

'I have had that sort of feeling, too,' he admitted. 'But what can one do about it? And after all, is it really important? There are a good many things in this universe which are not exactly as we should like them.'

Aretenon smiled.

'That's true enough. But Therodimus has found how to do something about it. Will you come and see him?'

'It must be a long journey.'

'About twenty days from here, and we have to go across a river.' Jeryl felt Eris give a little shudder. The Atheleni hated water, for the excellent and sufficient reason that they were too heavily boned to swim, and promptly drowned if they fell into it.

'It's in enemy territory: they won't like me.'

'They respect you, and it might be a good idea for you to go—a friendly gesture, as it were.'

'But I'm wanted here.'

'You can take my word that nothing you do here is as important as the message Therodimus has for you—and for the whole world.'

Eris veiled his thoughts for a moment, then uncovered them briefly.

'I'll think about it,' he said.

It was surprising how little Aretenon managed to say on the many days of the journey. From time to time Eris would challenge the defences of his mind with half-playful thrusts, but always they were parried with an effortless skill. About the ultimate weapon that had ended the War he would say nothing, but Eris knew that those who had wielded it had not yet disbanded and were still at their secret hiding-place. Yet though he would not talk about the past, Aretenon often spoke of the future, and with the urgent anxiety of one who had helped to shape it and was not sure if he had acted aright. Like many others of his race, he was haunted by what he had done, and the sense of guilt sometimes overwhelmed him. Often he made remarks which puzzled Eris at the time, but which he was to remember more and more vividly in the years ahead.

'We've come to a turning-point in our history, Eris. The powers

we've uncovered will soon be shared by the Mithraneans, and another war will mean destruction for us both. All my life I've worked to increase our knowledge of the mind, but now I wonder if I've brought something into the world that is too powerful, and too dangerous for us to handle. Yet it's too late, now, to retrace our footsteps: sooner or later our culture was bound to come to this point, and to discover what we have found.

'It's a terrible dilemma: and there's only one solution. We cannot go back, and if we go forward we may meet disaster. So we must change the very nature of our civilization, and break completely with the million generations behind us. You can't imagine how that could be done: nor could I, until I met Therodimus and he told me of his dream.'

'The mind is a wonderful thing, Eris—but by itself it is helpless in the universe of matter. We know now how to multiply the power of our brains by an enormous factor: we can solve, perhaps, the great problems of mathematics that have baffled us for ages. But neither our unaided minds, nor the group-mind we've now created, can alter in the slightest the one fact that all through history has brought us and the Mithraneans into conflict—the fact that the food supply is fixed, and our populations are not.'

Jeryl would watch them, taking little part in their thoughts, as they argued these matters. Most of their discussions took place while they were browsing, for like all active ruminants they had to spend a considerable part of each day searching for food. Fortunately the land through which they were passing was extremely fertile—indeed, its fertility had been one of the causes of the War. Eris, Jeryl was glad to see, was becoming something of his old self again. The feeling of frustrated bitterness that had filled his mind for so many months had not lifted, but it was no longer as all-pervading as it had been.

They left the open plain on the twenty-second day of their journey. For a long time they had been travelling through Mithraean territory, but those few of their ex-enemies they had seen had been inquisitive rather than hostile. Now the grasslands were coming to an end, and the forest with all its primeval terrors lay ahead.

'Only one carnivore lives in this region,' Aretenon reassured them, 'and it's no match for the three of us. We'll be past the trees in a day and a night.'



'A night—in the forest!' gasped Jeryl, half-petrified with terror at the very thought.

Aretenon was obviously a little ashamed of himself.

'I didn't like to mention it before,' he apologized, 'but there's really no danger. I've done it by myself, several times. After all, none of the great flesh-eaters of ancient times still exists—and it won't be really dark, even in the woods. The red sun will still be up.'

Jeryl was still trembling slightly. She came of a race which, for thousands of generations, had lived on the high hills and the open plains, relying on speed to escape from danger. The thought of going among trees—and in the dim red twilight while the primary sun was down—filled her with panic. And of the three of them, only Aretenon possessed a horn with which to fight. (It was nothing like so long or sharp, thought Jeryl, as Eris's had been.)

She was still not at all happy even when they had spent a completely uneventful day moving through the woods. The only animals they saw were tiny, long-tailed creatures that ran up and down the tree-trunks with amazing speed, gibbering with anger as the intruders passed. It was entertaining to watch them, but Jeryl did not think that the forest would be quite so amusing in the night.

Her fears were well founded. When the fierce white sun passed below the trees, and the crimson shadows of the red giant lay everywhere, a change seemed to come over the world. A sudden silence swept across the forest—a silence abruptly broken by a very distant wail towards which the three of them turned instinctively, ancestral warnings shrieking in their minds.

'What was that?' gasped Jeryl.

Aretenon was breathing swiftly, but his reply was calm enough.

'Never mind,' he said. 'It was a long way off. I don't know what it was.'

They took turns to keep guard, and the long night wore slowly away. From time to time Jeryl would awaken from troubled dreams into the nightmare reality of the strange, distorted trees gathered threateningly around her. Once, when she was on guard, she heard the sound of a heavy body moving through the woods very far away—but it came no nearer and she did not disturb the others. So at last the longed-for brilliance of the white sun began to flood the sky, and the day had come again.

Aretenon, Jeryl thought, was probably more relieved than he pretended to be. He was almost boyish as he frisked around in the morning sunlight, snatching an occasional mouthful of foliage from an overhanging branch.

'We've only half a day to go now,' he said cheerfully. 'We'll be out of the forest by noon.'

There was a mischievous undertone to his thoughts that puzzled Jeryl. It seemed as if Aretenon was keeping still another secret from them, and Jeryl wondered what further obstacles they would have to overcome. By midday she knew, for their way was barred by a great river flowing slowly past them as if in no haste to meet the sea.

Eris looked at it with some annoyance, measuring it with a practised eye.

'It's much too deep to ford here. We'll have to go a long way upstream before we can cross.'

Aretenon smiled.

'On the contrary,' he said cheerfully, 'we're going *downstream*.'

Eris and Jeryl looked at him in amazement.

'Are you mad?' Eris cried.

'You'll soon see. We've not far to go now—you've come all this way, so you might as well trust me for the rest of the journey.'

The river slowly widened and deepened. If it had been impassable before, it was doubly so now. Sometimes, Eris knew, one came upon a stream across which a tree had fallen, so that one could walk over the trunk—though it was a risky thing to do. But this river was the width of many trees, and was growing no narrower.

'We're nearly there,' said Aretenon at last. 'I recognize the place. Someone should be coming out of those woods at any moment.' He gestured with his horn to the trees on the far side of the river, and almost as he did so three figures came bounding out on to the bank. Two of them, Jeryl saw, were Atheleni: the third was a Mithraean.

They were now nearing a great tree, standing by the water's edge, but Jeryl had paid little attention: she was too interested in the figures on the distant bank, wondering what they were going to do next. So when Eris's amazement exploded like a thunderclap in the depths of her own mind, she was too confused for a moment to realize its cause. Then she turned towards the tree, and saw what Eris had seen.



To some minds and some races, few things could have been more natural or more commonplace than a thick rope tied round a tree-trunk, and floating out across the water of a river to another tree on the far bank. Yet it filled both Jeryl and Eris with the terror of the unknown, and for one awful moment Jeryl thought that a gigantic snake was emerging from the water. Then she saw that it was not alive, but her fear remained. For it was the first artificial object that she had ever seen.

'Don't worry about *what* it is, or how it was put there,' counselled Aretenon. 'It's going to carry you across, and that's all that matters for the moment. Look—there's someone coming over now!'

One of the figures on the far bank had lowered itself into the water, and was working its way with its forelimbs along the rope. As it came nearer—it was the Mithraean, and a female—Jeryl saw that it was carrying a second and much smaller rope looped round the upper part of its body.

With the skill of long practice, the stranger made her way across the floating cable, and emerged dripping from the river. She seemed to know Aretenon, but Jeryl could not intercept their thoughts.

'I can go across without any help,' said Aretenon, 'but I'll show you the easy way.'

He slipped the loop over his shoulders, and, dropping into the water, hooked his forelimbs over the fixed cable. A moment later he was being dragged across at a great speed by the two others on the far bank, where, after much trepidation, Eris and Jeryl presently joined him.

It was not the sort of bridge one would expect from a race which could quite easily have dealt with the mathematics of a reinforced concrete arch—if the possibility of such an object had ever occurred to it. But it served its purpose, and once it had been made, they could use it readily enough.

*Once it had been made. But—who had made it?*

When their dripping guides had rejoined them, Aretenon gave his friends a warning.

'I'm afraid you're going to have a good many shocks while you're here. You'll see some very strange sights, but when you understand them, they'll cease to puzzle you in the slightest. In fact, you will soon come to take them for granted.'

One of the strangers, whose thoughts neither Eris nor Jeryl could intercept, was giving him a message.

'Therodimus is waiting for us,' said Aretenon. 'He's very anxious to see you.'

'I've been trying to contact him,' complained Eris, 'but I've not succeeded.'

Aretenon seemed a little troubled.

'You'll find he's changed,' he said. 'After all, you've not seen each other for many years. It may be some time before you can make full contact again.'

Their road was a winding one through the forest, and from time to time curiously narrow paths branched off in various directions. Therodimus, thought Eris, must have changed indeed for him to have taken up permanent residence among trees. Presently the track opened out into a large, semicircular clearing with a low white cliff lying along its diameter. At the foot of the cliff were several dark holes of varying sizes—obviously the openings of caves.

It was the first time that either Eris or Jeryl had ever entered a cave, and they did not greatly look forward to the experience. They were relieved when Aretenon told them to wait just outside the opening, and went on alone towards the puzzling yellow light that glowed in the depths. A moment later, dim memories began to pulse in Eris's mind, and he knew that his old teacher was coming, even though he could no longer fully share his thoughts.

Something stirred in the gloom, and then Therodimus came out into the sunlight. At the sight of him, Jeryl screamed once and buried her head in Eris's mane, but Eris stood firm, though he was trembling as he had never done before battle. For Therodimus blazed with a magnificence that none of his race had ever known since history began. Around his neck hung a band of glittering objects that caught and refracted the sunlight in a myriad colours, while covering his body was a sheet of some thick, many-hued material that rustled softly as he walked. And his horn was no longer the yellow of ivory: some magic had changed it to the most wonderful purple that Jeryl had ever seen.

Therodimus stood motionless for a moment, savouring their amazement to the full. Then his rich laugh echoed in their minds, and he reared up on his hind limb. The coloured garment fell

whispering to the ground, and at a toss of his head the glittering necklace arched like a rainbow into a corner of the cave. But the purple horn remained unchanged.

It seemed to Eris that he stood at the brink of a great chasm, with Therodimus beckoning him on the far side. Their thoughts struggled to form a bridge, but could make no contact. Between them was the gulf of half a lifetime and many battles, of a myriad unshared experiences—Therodimus's years in this strange land, his own mating with Jeryl and the memory of their lost children. Though they stood face to face, a few feet only between them, their thoughts could never meet again.

Then Aretenon, with all the power and authority of his unsurpassed skill, did something to his mind that Eris was never quite able to recall. He only knew that the years seemed to have rolled back, that he was once more the eager, anxious pupil—and that he could speak to Therodimus again.

It was strange to sleep underground, but less unpleasant than spending the night amid the unknown terrors of the forest. As she watched the crimson shadows deepening beyond the entrance to the little cave, Jeryl tried to collect her scattered thoughts. She had understood only a small part of what had passed between Eris and Therodimus, but she knew that something incredible was taking place. The evidence of her eyes was enough to prove that: today she had seen things for which there were no words in her language.

She had heard things, too. As they had passed one of the cave-mouths, there had come from it a rhythmic 'whirring' sound, unlike that made by any animal she knew. It had continued steadily without pause or break as long as she could hear it, and even now its unhurried rhythm had not left her mind. Aretenon, she believed, had also noticed it, though without any surprise: Eris had been so engrossed with Therodimus.

The old philosopher had told them very little, preferring, as he said, to show them his empire when they had had a good night's rest. Nearly all their talk had been concerned with the events of their own land during the last few years, and Jeryl found it somewhat boring. Only one thing had interested her, and she had eyes for little else. That was the wonderful chain of coloured crystals that Therodimus had worn around his neck. What it was, or how it had been created, she could not imagine: but she coveted

it. As she fell asleep, she found herself thinking idly, but more than half-seriously, of the sensation it would cause if she returned to her people with such a marvel gleaming against her own pelt. It would look so much better there than upon old Therodimus.

Aretenon and Therodimus met them at the cave soon after dawn. The philosopher had discarded his regalia—which he had obviously worn only to impress his guests—and his horn had returned to its normal yellow. That was one thing Jeryl thought she could understand, for she had come across fruits whose juices could cause colour changes.

Therodimus settled himself at the mouth of the cave. He began his narration without any preliminaries, and Eris guessed that he must have told it many times before to earlier visitors.

'I came to this place, Eris, about five years after leaving our country. As you know, I was always interested in strange lands, and from the Mithraeans I'd heard rumours that intrigued me very much. How I traced them to their source is a long story that doesn't matter now. I crossed the river far upstream one summer, when the water was very low. There's only one place where it can be done, and then only in the driest years. Higher still the river loses itself in the mountains, and I don't think there's any way through them. So this is virtually an island—almost completely cut off from Mithraean territory.

'It's an island, but it's not uninhabited. The people who live here are called the Phileni, and they have a very remarkable culture—one entirely different from our own. Some of the products of that culture you've already seen.

'As you know, there are many different races on our world, and quite a few of them have some sort of intelligence. But there is a great gulf between us and all other creatures. As far as we know, we are the only beings capable of abstract thought and complex logical processes.

'The Phileni are a much younger race than ours, and they are intermediate between us and the other animals. They've lived here on this rather large island for several thousand generations—but their rate of development has been many, many times swifter than ours. They neither possess nor understand our telepathic powers, but they have something else which we may well envy—something which is responsible for the whole of their civilization and its incredibly rapid progress.'

Therodimus paused, then rose slowly to his feet.

'Follow me,' he said. 'I'll take you to see the Phileni.'

He led them back to the caves from which they had come the night before, pausing at the entrance from which Jeryl had heard that strange, rhythmic whirring. It was clearer and louder now, and she saw Eris start as though he had noticed it for the first time. Then Therodimus uttered a high-pitched whistle, and at once the whirring slackened, falling octave by octave until it had ebbed into silence. A moment later something came towards them out of the semi-gloom.

It was a little creature, scarcely half their height, and it did not hop, but walked upon two jointed limbs that seemed very thin and feeble. Its large spherical head was dominated by three huge eyes, set far apart and capable of independent movement. With the best will in the world, Jeryl did not think it was very attractive.

Then Therodimus uttered another whistle, and the creature raised its forelimbs towards them.

'Look closely,' said Therodimus, very gently, 'and you will see the answer to many of your questions.'

For the first time, Jeryl saw that the creature's forelimbs did not end in hooves, or indeed after the fashion of any animal with which she was acquainted. Instead, they divided into at least a dozen thin, flexible tentacles and two hooked claws.

'Go towards it, Jeryl,' commanded Therodimus. 'It has something for you.'

Hesitantly, Jeryl moved forward. She noticed that the creature's body was crossed with bands of dark material, to which were attached unidentifiable objects. It dropped a forelimb to one of these, and a cover opened to reveal a cavity inside which something glittered. Then the little tentacles were clutching that marvellous crystal necklace, and with a movement so swift and dexterous that Jeryl could scarcely follow it, the Phileni moved forward and clasped it round her neck.

Therodimus brushed aside her confusion and gratitude, but his shrewd old mind was well pleased. Jeryl would be his ally now in whatever he planned to do. But Eris's emotions might not be so easily swayed, and in this matter mere logic was not enough. His old pupil had changed so much, had been so deeply wounded by the past, that Therodimus could not be certain of success. Yet he had a plan that could turn even these difficulties to his advantage.

He gave another whistle, and the Phileni made a curious waving gesture with its hands and disappeared into the cave. A moment later that strange whirring ascended once more from the silence, but Jeryl's curiosity was now quite overshadowed by her delight in her new possession.

'We'll go through the woods,' said Therodimus, 'to the nearest settlement—it's only a little way from here. The Phileni don't live in the open, as we do. In fact, they differ from us in almost every conceivable way. I'm even afraid,' he added ruefully, 'that they're much better natured than we are, and I believe that one day they'll be more intelligent. But first of all, let me tell you what I've learned about them, so that you can understand what I'm planning to do.'

The mental evolution of any race is conditioned, even dominated, by physical factors which that race almost invariably takes for granted as part of the natural order of things. The wonderfully sensitive hands of the Phileni had enabled them to find by experiment and trial facts which had taken the planet's only other intelligent species a thousand times as long to discover by pure deduction. Quite early in their history, the Phileni had invented simple tools. From these they had proceeded to fabrics, pottery, and the use of fire. When Therodimus had discovered them, they had already invented the lathe and the potter's wheel, and were about to move into their first Metal Age—with all that that implied.

On the purely intellectual plane, their progress had been less rapid. They were clever and skilful, but they had a dislike of abstract thought and their mathematics was purely empirical. They knew, for example, that a triangle with sides in the ratio three-four-five was right-angled, but had not suspected that this was only a special case of a much more general law. Their knowledge was full of such yawning gaps, which, despite the help of Therodimus and his several score disciples, they seemed in no great hurry to fill.

Therodimus they worshipped as a god, and for two whole generations of their short-lived race they had obeyed him in everything, giving him all the products of their skill that he needed, and making at his suggestion the new tools and devices that had occurred to him. The partnership had been incredibly fertile, for it was as if both races had suddenly been released from their shackles. Great manual skill and great intellectual powers had fused in a fruitful union probably unique in all the universe—and progress

that would normally have taken millennia had been achieved in less than a decade.

As Artenon had promised them, though Eris and Jeryl saw many marvels, they came across nothing that they could not understand once they had watched the little Phileni craftsmen at work and had seen with what magic their hands shaped natural materials into lovely or useful forms. Even their tiny towns and primitive farms soon lost their wonder and became part of the accepted order of things.

Therodimus let them look their fill, until they had seen every aspect of this strangely sophisticated Stone Age culture. Because they knew no differently, they found nothing incongruous in the sight of a Phileni potter—who could scarcely count beyond ten—shaping a series of complex algebraic surfaces under the guidance of a young Mithraean mathematician. Like all his race, Eris possessed tremendous powers of mental visualization, but he realized how much easier geometry would be if one could actually see the shapes one was considering. From this beginning (though he could not guess it) would one day evolve the idea of a written language.

Jeryl was fascinated above all things by the sight of the little Phileni women weaving fabrics upon their primitive looms. She could sit for hours watching the flying shuttles and wishing that she could use them. Once one had seen it done, it seemed so simple and obvious—and so utterly beyond the powers of the clumsy, useless limbs of her own people.

They grew very fond of the Phileni, who seemed eager to please and were pathetically proud of all their manual skills. In these new and novel surroundings, meeting fresh wonders every day, Eris seemed to be recovering from some of the scars which the War had left upon his mind. Jeryl knew, however, that there was still much damage to be undone. Sometimes, before he could hide them, she would come across raw, angry wounds in the depths of Eris's mind, and she feared that many of them—like the broken stump of his horn—would never heal. Eris had hated the War, and the manner of its ending still oppressed him. Beyond this, Jeryl knew, he was haunted by the fear that it might come again.

These troubles she often discussed with Therodimus, of whom she had now grown very fond. She still did not fully understand why he had brought them here, or what he and his followers were planning to do. Therodimus was in no hurry to explain his actions,

for he wished Jeryl and Eris to draw their own conclusions as far as possible. But at last, five days after their arrival, he called them to his cave.

'You've now seen,' he began, 'most of the things we have to show you here. You know what the Phileni can do, and perhaps you have thought how much our own lives will be enriched once we can use the products of their skill. That was my first thought when I came here, all those years ago.'

'It was an obvious and rather naïve idea, but it led to a much greater one. As I grew to know the Phileni, and found how swiftly their minds had advanced in so short a time, I realized what a fearful disadvantage our own race had always laboured under. I began to wonder how much further forward we would have been had we the Phileni's control over the physical world. It is not a question of mere convenience, or the ability to make beautiful things like that necklace of yours, Jeryl, but something much more profound. It is the difference between ignorance and knowledge, between weakness and power.'

'We have developed our minds, and our minds alone, until we can go no further. As Artenon has told you, we have now come to a danger that threatens our entire race. We are under the shadow of the irresistible weapon against which there can be no defence.'

'The solution is, quite literally, in the hands of the Phileni. We must use their skills to reshape our world, and so remove the cause of all our wars. We must go back to the beginning and re-lay the foundations of our culture. It won't be *our* culture alone, though, for we shall share it with the Phileni. They will be the hands—we the brains. Oh, I have dreamed of the world that may come, ages ahead, when even the marvels you see around you now will be considered childish toys! But not many are philosophers, and I need an argument more substantial than dreams. That final argument I believe I may have found, though I cannot yet be certain.'

'I have asked you here, Eris, partly because I wanted to renew our old friendship, and partly because your word will now have far greater influence than mine. You are a hero among your own people, and the Mithraeans also will listen to you. I want you to return, taking with you some of the Phileni and their products. Show them to your people, and ask them to send their young men here to help us with our work.'

There was a pause during which Jeryl could gather no hints of Eris's thoughts. Then he replied hesitantly:

'But I still don't understand. These things that the Phileni make are very pretty, and some of them may be useful to us. But how can they change us as profoundly as you seem to think?'

Therodimus sighed. Eris could not see past the present into the future that was yet to be. He had not caught, as Therodimus had done, the promise that lay beyond the busy hands and tools of the Phileni—the first faint possibilities of the Machine. Perhaps he would never understand: but he could still be convinced.

Veiling his deeper thoughts, Therodimus continued:

'Perhaps some of these things are toys, Eris—but they may be more powerful than you think. Jeryl, I know, would be loath to part with hers . . . and perhaps I can find one that would convince you.'

Eris was sceptical, and Jeryl could see that he was in one of his darker moods.

'I doubt it very much,' he said.

'Well, I can try.' Therodimus gave a whistle, and one of the Phileni came running up. There was a short exchange of conversation.

'Would you come with me, Eris? It will take some time.'

Eris followed him, the others, at Therodimus's request, remaining behind. They left the large cave and went towards the row of smaller ones which the Phileni used for their various trades.

The strange whirring was sounding loudly in Eris's ears, but for a moment he could not see its cause, the light of the crude oil lamps being too faint for his eyes. Then he made out one of the Phileni bending over a wooden table upon which something was spinning rapidly, driven by a belt from a treadle operated by another of the little creatures. He had seen the potters using a similar device, but this was different. It was shaping wood, not clay, and the potter's fingers had been replaced by a sharp metal blade from which long, thin shavings were curling out in fascinating spirals. With their huge eyes the Phileni, who disliked full sunlight, could see perfectly in the gloom, but it was some time before Eris could discover just what was happening. Then, suddenly, he understood.

'Aretenon,' said Jeryl when the others had left them, 'why should the Phileni do all these things for us? Surely they're quite happy as they are?'

The question, Aretenon thought, was typical of Jeryl and would never have been asked by Eris.

'They will do anything that Therodimus says,' he answered, 'but even apart from that there's so much we can give them as well. When we turn our minds to their problems, we can see how to solve them in ways that would never have occurred to them. They're very eager to learn, and already we must have advanced their culture by hundreds of generations. Also, they're physically very feeble. Although we don't possess their dexterity, our strength makes possible tasks they could never attempt.'

They had wandered to the edge of the river, and stood for a moment watching the unhurried waters moving down to the sea. Then Jeryl turned to go upstream, but Aretenon stopped her.

'Therodimus doesn't want us to go that way, yet,' he explained. 'It's just another of his little secrets. He never likes to reveal his plans until they're ready.'

Slightly piqued, and distinctly curious, Jeryl obediently turned back. She would, of course, come this way again as soon as there was no one else about.

It was very peaceful here in the warm sunlight, among the pools of heat trapped by the trees. Jeryl had almost lost her fear of the forest, though she knew she would never be quite happy there.

Aretenon seemed very abstracted, and Jeryl knew that he wished to say something and was marshalling his thoughts. Presently he began to speak, with the freedom that is only possible between two people who are fond of each other but have no emotional ties.

'It is very hard, Jeryl,' he began, 'to turn one's back on the work of a lifetime. Once I had hoped that the great new forces we have discovered could be safely used, but now I know that it is impossible, at least for many ages. Therodimus was right—we can go no further with our minds alone. Our culture has been hopelessly one-sided, though through no fault of ours. We cannot solve the fundamental problem of peace and war without a command over the physical world such as the Phileni possess—and which we hope to borrow from them.'

'Perhaps there will be other great adventures here for our minds, to make us forget what we will have to abandon. We shall be able to learn something from Nature at last. What is the difference between fire and water, between wood and stone? What are the suns, and what are those millions of faint lights we see in the sky



when both the suns are down? Perhaps the answers to all these questions may lie at the end of the new road along which we must travel.'

He paused.

'New knowledge—new wisdom—in realms we have never dreamed of before. It may lure us away from the dangers we have encountered: for certainly nothing we can learn from Nature will ever be as great a threat as the peril we have uncovered in our own minds.'

The flow of Aretenon's thoughts was suddenly interrupted. Then he said: 'I think Eris wants to see you.'

Jeryl wondered why Eris had not sent the message to her: she wondered, too, at the undertone of amusement—or was it something else?—in Aretenon's mind.

There was no sign of Eris as they approached the caves, but he was waiting for them and came bounding out into the sunlight before they could reach the entrance. Then Jeryl gave an involuntary cry, and retreated a pace or two as her mate came towards her.

For Eris was whole again. Gone was the shattered stump on his forehead: it had been replaced by a new, gleaming horn no less splendid than the one he had lost.

In a belated gesture of greeting, Eris touched horns with Aretenon. Then he was gone into the forest in great joyous leaps—but not before his mind had met Jeryl's as it had seldom done since the days before the War.

'Let him go,' said Therodimus softly. 'He would rather be alone. When he returns I think you will find him—different.' He gave a little laugh. 'The Phileni are clever, are they not? Now, perhaps, Eris will be more appreciative of their "toys".'

'I know I am impatient,' said Therodimus, 'but I am old now, and I want to see the changes begin in my own lifetime. That is why I am starting so many schemes in the hope that some at least will succeed. But this is the one, above all, in which I have put most faith.'

For a moment he lost himself in his thoughts. Not one in a hundred of his own race could fully share his dream. Even Eris, though he now believed in it, did so with his heart rather than his mind. Perhaps Aretenon—the brilliant and subtle Aretenon, so desperately anxious to neutralize the powers he had brought into

the world—might have glimpsed the reality. But his was of all minds the most impenetrable, save when he wished otherwise.

'You know as well as I do,' continued Therodimus, as they walked upstream, 'that our wars have only one cause—Food. We and the Mithraeans are trapped on this continent of ours with its limited resources, which we can do nothing to increase. Ahead of us we have always the nightmare of starvation, and for all our vaunted intelligence there has been nothing we can do about it. Oh yes, we have scraped some laborious irrigation ditches with our forehooves, but how slight their help has been!

'The Phileni have discovered how to grow crops that increase the fertility of the ground manyfold. I believe that we can do the same—once we have adapted their tools for our own use. That is our first and most important task, but it is not the one on which I have set my heart. The final solution to our problem, Eris, *must be the discovery of new, virgin lands into which our people can migrate.*' He smiled at the other's amazement.

'No, don't think I'm mad. Such lands do exist, I'm sure of it. Once I stood at the edge of the ocean and watched a great flight of birds coming inland from far out at sea. I have seen them flying outwards, too, so purposefully that I was certain they were going to some other country. And I have followed them with my thoughts.'

'Even if your theory is true, as it probably is,' said Eris, 'what use is it to us?' He gestured to the river flowing beside them. 'We drown in the water, and you cannot build a rope to support us—' His thoughts suddenly faded out into a jumbled chaos of ideas. Therodimus smiled.

'So you have guessed what I hope to do. Well, now you can see if you are right.'

They had come to a level stretch of bank, upon which a group of the Phileni were busily at work, under the supervision of some of Therodimus's assistants. Lying at the water's edge was a strange object which, Eris realized, was made of many tree-trunks joined together by ropes.

They watched in fascination as the orderly tumult reached its climax. There was a great pulling and pushing, and the raft moved ponderously into the water with a mighty splash. The spray had scarcely ceased to fall when a young Mithraean leaped from the bank and began to dance gleefully upon the logs, which were now tugging at the moorings as if eager to break away and follow the



river down to the sea. A moment later he had been joined by others, rejoicing in their mastery of a new element. The little Phileni, unable to make the leap, stood watching patiently on the bank while their masters enjoyed themselves.

There was an exhilaration about the scene that no one could fail to miss, though perhaps few of those present realized that they were at a turning-point in history. Only Therodimus stood a little apart from the rest, lost in his own thoughts. This primitive raft, he knew, was merely a beginning. It must be tested upon the river, then along the shores of the ocean. The work would take years, and he was never likely to see the first voyagers returning from those fabulous lands whose existence was still no more than a guess. But what had been begun, others would finish.

Overhead, a flight of birds was passing across the forest. Therodimus watched them go, envying their freedom to move at will over land and sea. He had begun the conquest of the water for his race, but that the skies might one day be theirs also was beyond even his imagination.

Aretenon, Jeryl and the rest of the expedition had already crossed the river when Eris said goodbye to Therodimus. This time they had done so without a drop of water touching their bodies, for the raft had come downstream and was performing valuable duties as a ferry. A new and much improved model was already under construction, as it was painfully obvious that the prototype was not exactly seaworthy. These initial difficulties would be quickly overcome by designers who, even if they were forced to work with Stone Age tools, could handle with ease the mathematics of meta-centres, buoyancies and advanced hydrodynamics.

'Your task won't be a simple one,' said Therodimus, 'for you cannot show your people all the things you have seen here. At first you must be content to sow the seed, to arouse interest and curiosity—particularly among the young, who will come here to learn more. Perhaps you will meet opposition: I expect so. But every time you return to us, we shall have new things to show you and to strengthen your arguments.'

They touched horns: then Eris was gone, taking with him the knowledge that was to change the world—so slowly at first, then ever more swiftly. Once the barriers were down, once the Mithraeans and the Atheleni had been given the simple tools which they could fasten to their forelimbs and use unaided, pro-

gress would be swift. But for the present they must rely on the Phileni for everything: and there were so few of them.

Therodimus was well content. Only in one respect was he disappointed, for he had hoped that Eris, who had always been his favourite, might also be his successor. The Eris who was now returning to his own people was no longer self-obsessed or embittered, for he had a mission and hope for the future. But he lacked the keen, far-ranging vision that was needed here: it would be Aretenon who must continue what he had begun. Still, that could not be helped, and there was no need yet to think of such matters. Therodimus was very old, but he knew that he would be meeting Eris many times again here by the river at the entrance to his land.

The ferry was gone now, and though he had expected it, Eris stopped amazed at the great span of the bridge, swaying slightly in the breeze. Its execution did not quite match its design—a good deal of mathematics had gone into its parabolic suspension—but it was still the first great engineering feat in history. Constructed though it was entirely of wood and rope, it forecast the shape of the metal giants to come.

Eris paused in mid-stream. He could see smoke rising from the shipyards facing the ocean, and thought he could just glimpse the masts of some of the new vessels that were being built for coastal trade. It was hard to believe that when he had first crossed this river he had been dragged over dangling from a rope.

Aretenon was waiting for them on the far bank. He moved rather slowly now, but his eyes were still bright with the old, eager intelligence. He greeted Eris warmly.

'I'm glad you could come now. You're just in time.'

That, Eris knew, could mean only one thing.

'The ships are back?'

'Almost: they were sighted an hour ago, out on the horizon. They should be here at any moment, and then we shall know the truth at last, after all these years. If only—'

His thoughts faded out, but Eris could continue them. They had come to the great pyramid of stones beneath which Therodimus lay—Therodimus, whose brain was behind everything they saw, but who could never learn now if his most cherished dream was true or not.

There was a storm coming up from the ocean, and they hurried along the new road that skirted the river's edge. Small boats of a kind that Eris had not seen before went past them occasionally, operated by Atheleni or Mithraneans with wooden paddles strapped to their forelimbs. It always gave Eris great pleasure to see such new conquests, such new liberations of his people from their age-old chains. Yet sometimes they reminded him of children who had suddenly been let loose into a wonderful new world, full of exciting and interesting things that must be done, whether they were likely to be useful or not. However, anything that promised to make his race into better sailors was more than useful. In the last decade Eris had discovered that pure intelligence was sometimes not enough: there were skills that could not be acquired by any amount of mental effort. Though this people had largely overcome their fear of water, they were still quite incompetent on the ocean, and the Phileni had therefore become the first navigators of the world.

Jeryl looked nervously around her as the first peal of thunder came rolling in from the sea. She was still wearing the necklace that Therodimus had given her so long ago; but it was by no means the only ornament she carried now.

'I hope the ships will be safe,' she said anxiously.

'There's not much wind, and they will have ridden out much worse storms than this,' Aretenon reassured her, as they entered his cave. Eris and Jeryl looked round with eager interest to see what new wonders the Phileni had made during their absence: but if there were any they had, as usual, been hidden away until Aretenon was ready to show them. He was still rather childishly fond of such little surprises and mysteries.

There was an air of absentmindedness about the meeting that would have puzzled an onlooker ignorant of its cause. As Eris talked of all the changes in the outer world, of the success of the new Phileni settlements, and of the steady growth of agriculture among his people, Aretenon listened with only half his mind. His thoughts, and those of his friends, were far out at sea, meeting the oncoming ships which might be bringing the greatest news their world had ever received.

As Eris finished his report, Aretenon rose to his feet and began to move restlessly around the chamber.

'You have done better than we dared to hope at the beginning. At least there has been no war for a generation, and our food

supply is ahead of the population for the first time in history—thanks to our new agricultural techniques.'

Aretenon glanced at the furnishings of his chamber, recalling with an effort the fact that in his own youth almost everything he saw would have appeared impossible or even meaningless to him. Not even the simplest of tools had existed then, at least in the knowledge of his people. Now there were ships and bridges and houses—and these were only the beginning.

'I am well satisfied,' he said. 'We have, as we planned, diverted the whole stream of our culture, turning it away from the dangers that lay ahead. The powers that made the Madness possible will soon be forgotten: only a handful of us still know of them, and we will take our secrets with us. Perhaps when our descendants re-discover them they will be wise enough to use them properly. But we have uncovered so many new wonders that it may be a thousand generations before we turn again to look into our own minds and to tamper with the forces locked within them.'

The mouth of the cave was illuminated by a sudden flash of lightning. The storm was coming nearer, though it was still some miles away. Rain was beginning to fall in large, angry drops from the leaden sky.

'While we're waiting for the ships,' said Aretenon rather abruptly, 'come into the next cave and see some of the new things we have to show you since your last visit.'

It was a strange collection. Side by side on the same bench were tools and inventions which in other cultures had been separated by thousands of years of time. The Stone Age was past: bronze and iron had come, and already the first crude scientific instruments had been built for experiments that were driving back the frontiers of the unknown. A primitive retort spoke of the beginnings of chemistry, and by its side were the first lenses the world had seen—waiting to reveal the unsuspected universes of the infinitely small and the infinitely great.

The storm was upon them as Aretenon's description of these new wonders drew to its close. From time to time he had glanced nervously at the mouth of the cave, as if awaiting a messenger from the harbour, but they had remained undisturbed save by the occasional crash of thunder.

'I've shown you everything of importance,' he said, 'but here's something that may amuse you while we're waiting. As I said,

we've sent expeditions everywhere to collect and classify all the rocks they can, in the hope of finding useful minerals. One of them brought back this.'

He extinguished the lights and the cave became completely dark. 'It will be some time before your eyes grow sensitive enough to see it,' Aretenon warned. 'Just look over there in that corner.'

Eris strained his eyes into the darkness. At first he could see nothing: then, slowly, a glimmering blue light became faintly visible. It was so vague and diffuse that he could not focus his eyes upon it, and he automatically moved forward.

'I shouldn't go too near,' advised Aretenon. 'It seems to be a perfectly ordinary mineral, but the Phileni who found it and carried it here got some very strange burns from handling it. Yet it's quite cold to the touch. One day we'll learn its secret: but I don't suppose it's anything at all important.'

A vast curtain of sheet lightning split the sky, and for a moment the reflected glare lit up the cave, pinning weird shadows against the walls. At the same moment one of the Phileni staggered into the entrance and called something to Aretenon in its thin, reedy voice. He gave a great shout of triumph, as one of his ancestors might have done on some ancient battlefield: then his thoughts came crashing into Eris's mind.

'Land! They've found land—a whole new continent waiting for us!'

Eris felt the sense of triumph and victory well up within him like water bursting from a spring. Clear ahead now into the future lay the new, the glorious road along which their children would travel, mastering the world and all its secrets as they went. The vision of Therodimus was at last sharp and brilliant before his eyes.

He felt for the mind of Jeryl, so that she could share his joy—and found that it was closed to him. Leaning toward her in the darkness, he could sense that she was still staring into the depths of the cave, as if she had never heard the wonderful news, and could not tear her eyes away from that enigmatic glow.

Out of the night came the roar of the belated thunder as it raced across the sky. Eris felt Jeryl tremble beside him, and sent out his thoughts to comfort her.

'Don't let the thunder frighten you,' he said gently. 'What is there to fear now?'

'I do not know,' replied Jeryl. 'I am frightened—but not of the

thunder. Oh, Eris, it is a wonderful thing we have done, and I wish Therodimus could be here to see it. But where will it lead in the end—this new road of ours?'

Out of the past, the words that Aretenon had once spoken had risen up to haunt her. She remembered their walk by the river, long ago, when he had talked of his hopes and had said: 'Certainly nothing we can learn from Nature will ever be as great a threat as the peril we have encountered in our own minds.' Now the words seemed to mock her and to cast a shadow over the golden future: but why, she could not say.

Alone, perhaps, of all the races in the Universe, her people had reached the second crossroads—and had never passed the first. Now they must go along the road that they had missed, and must face the challenge at its end—the challenge from which, this time, they could not escape.

In the darkness, the faint glow of dying atoms burned unwavering in the rock. It would still be burning there, scarcely dimmed, when Jeryl and Eris had been dust for centuries. It would be only a little fainter when the civilization they were building had at last unlocked its secrets.

# THE QUEST FOR SAINT AQUIN

by Anthony Boucher

The Bishop of Rome, the head of the Holy, Catholic and Apostolic Church, the Vicar of Christ on Earth—in short, the Pope—brushed a cockroach from the filth-encrusted wooden table, took another sip of the raw red wine, and resumed his discourse.

"In some respects, Thomas," he smiled, "we are stronger now than when we flourished in the liberty and exaltation for which we still pray after Mass. We know, as they knew in the catacombs, that those who are of our flock are indeed truly of it; that they belong to Holy Mother the Church because they believe in the brotherhood of man under the fatherhood of God—not because they can further their political aspirations, their social ambitions, their business contacts."

"Not of the will of flesh, nor of the will of man, but of God . . ."

Thomas quoted softly from St. John.

The Pope nodded. "We are, in a way, born again in Christ; but there are still too few of us—too few even if we include those other handfuls who are not of our faith, but still acknowledge God through the teachings of Luther or Lao-tse, Gautama Buddha or Joseph Smith. Too many men still go to their deaths hearing no gospel preached to them but the cynical self-worship of the Technarchy. And that is why, Thomas, you must go forth on your quest."

"But Your Holiness," Thomas protested, "if God's word and God's love will not convert them, what can saints and miracles do?"

"I seem to recall," murmured the Pope, "that God's own Son once made a similar protest. But human nature, however illogical it may seem, is part of His design, and we must cater to it. If signs and wonders

*First published in 1951*

can lead souls to God, then by all means let us find the signs and wonders. And what can be better for the purpose than this legendary Aquin? Come now, Thomas; be not too scrupulously exact in copying the doubts of your namesake, but prepare for your journey."

The Pope lifted the skin that covered the doorway and passed into the next room, with Thomas frowning at his heels. It was past legal hours and the main room of the tavern was empty. The swarthy innkeeper roused from his doze to drop to his knees and kiss the ring on the hand which the Pope extended to him. He rose crossing himself and at the same time glancing furtively about as though a Loyalty Checker might have seen him. Silently he indicated another door in the back, and the two priests passed through.

Toward the west the surf purred in an oddly gentle way at the edges of the fishing village. Toward the south the stars were sharp and bright; toward the north they dimmed a little in the persistent radiation of what had once been San Francisco.

"Your steed is here," the Pope said, with something like laughter in his voice.

"Steed?"

"We may be as poor and as persecuted as the primitive church, but we can occasionally gain greater advantages from our tyrants. I have secured for you a robass—gift of a leading Technarch who, like Nicodemus, does good by stealth—a secret convert, and converted, indeed, by that very Aquin whom you seek."

It looked harmlessly like a woodpile sheltered against possible rain. Thomas pulled off the skins and contemplated the sleek functional lines of the robass. Smiling, he stowed his minimal gear into its panniers and climbed into the foam saddle. The starlight was bright enough so that he could check the necessary coordinates on his map and feed the data into the electronic controls.

Meanwhile there was a murmur of Latin in the still night air, and the Pope's hand moved over Thomas in the immemorial symbol. Then he extended that hand, first for the kiss on the ring, and then again for the handclasp of a man to a friend he may never see again.

Thomas looked back once more as the robass moved off. The Pope was wisely removing his ring and slipping it into the hollow heel of his shoe.

Thomas looked hastily up at the sky. On that altar at least the candles still burnt openly to the glory of God.

Thomas had never ridden a robass before, but he was inclined, within their patent limitations, to trust the works of the Technarchy. After sev-

eral miles had proved that the coordinates were duly registered, he put up the foam backrest, said his evening office (from memory; the possession of a breviary meant the death sentence), and went to sleep.

They were skirting the devastated area to the east of the Bay when he awoke. The foam seat and back had given him his best sleep in years; and it was with difficulty that he smothered an envy of the Technarchs and their creature comforts.

He said his morning office, breakfasted lightly, and took his first opportunity to inspect the robass in full light. He admired the fast-plodding, articulated legs, so necessary since roads had degenerated to, at best, trails in all save metropolitan areas; the side wheels that could be lowered into action if surface conditions permitted; and above all the smooth black mound that housed the electronic brain—the brain that stored commands and data concerning ultimate objectives and made its own decisions on how to fulfill those commands in view of those data; the brain that made this thing neither a beast, like the ass his Saviour had ridden, nor a machine, like the jeep of his many-times-great-grandfather, but a robot . . . a robass.

"Well," said a voice, "what do you think of the ride."

Thomas looked about him. The area of this fringe of desolation was as devoid of people as it was of vegetation.

"Well," the voice repeated unemotionally. "Are not priests taught to answer when spoken to politely."

There was no querying inflection to the question. No inflection at all—each syllable was at the same dead level. It sounded strange, mechanical . . .

Thomas stared at the black mound of brain. "Are you talking to me?" he asked the robass.

"Ha ha," the voice said in lieu of laughter. "Surprised, are you not?" "Somewhat," Thomas confessed. "I thought the only robots who could talk were in library information service and such."

"I am a new model. Designed-to-provide-conversation-to-entertain-the-way-worm-traveler," the robass said slurring the words together as though that phrase of promotional copy was released all at once by one of his simplest binary synapses.

"Well," said Thomas simply. "One keeps learning new marvels."

"I am no marvel. I am a very simple robot. You do not know much about robots do you."

"I will admit that I have never studied the subject closely. I'll confess to being a little shocked at the whole robotic concept. It seems almost as though man were arrogating to himself the powers of—" Thomas stopped abruptly.

"Do not fear," the voice droned on. "You may speak freely. All data concerning your vocation and mission have been fed into me. That was necessary otherwise I might inadvertently betray you."

Thomas smiled. "You know," he said, "this might be rather pleasant—having one other being that one can talk to without fear of betrayal, aside from one's confessor."

"Being," the robass repeated. "Are you not in danger of lapsing into heretical thoughts?"

"To be sure, it is a little difficult to know how to think of you—one who can talk and think but has no soul."

"Are you sure of that?"

"Of course I—Do you mind very much," Thomas asked, "if we stop talking for a little while? I should like to meditate and adjust myself to the situation."

"I do not mind. I never mind. I only obey. Which is to say that I do mind. This is very confusing language which has been fed into me."

"If we are together long," said Thomas, "I shall try teaching you Latin. I think you might like that better. And now let me meditate."

The robass was automatically veering further east to escape the permanent source of radiation which had been the first cyclotron. Thomas fingered his coat. The combination of ten small buttons and one large made for a peculiar fashion; but it was much safer than carrying a rosary, and fortunately the Loyalty Checkers had not yet realized the fashion's functional purpose.

The Glorious Mysteries seemed appropriate to the possible glorious outcome of his venture; but his meditations were unable to stay fixedly on the Mysteries. As he murmured his Aves he was thinking:

*If the prophet Balaam conversed with his ass, surely I may converse with my robass. Balaam has always puzzled me. He was not an Israelite; he was a man of Moab, which worshiped Baal and was warring against Israel; and yet he was a prophet of the Lord. He blessed the Israelites when he was commanded to curse them; and for his reward he was slain by the Israelites when they triumphed over Moab. The whole story has no shape, no moral; it is as though it was there to say that there are portions of the Divine Plan which we will never understand . . .*

He was nodding in the foam seat when the robass halted abruptly, rapidly adjusting itself to exterior data not previously fed into its calculations. Thomas blinked up to see a giant of a man glaring down at him.

"Inhabited area a mile ahead," the man barked. "If you're going there, show your access pass. If you ain't, steer off the road and stay off."



*Anthony Boucher*

Thomas noted that they were indeed on what might roughly be called a road, and that the robass had lowered its side wheels and retracted its legs. "We—" he began, then changed it to "I'm not going there. Just on toward the mountains. We—I'll steer around."

The giant grunted and was about to turn when a voice shouted from the crude shelter at the roadside. "Hey Joe! Remember about robasses!" Joe turned back. "Yeah, the 's right. Been a rumor about some robass got into the hands of Christians." He spat on the dusty road. "Guess I better see an ownership certificate."

To his other doubts Thomas now added certain uncharitable suspicions as to the motives of the Pope's anonymous Nicodemus, who had not provided him with any such certificate. But he made a pretense of searching for it, first touching his right hand to his forehead as if in thought, then fumbling low on his chest, then reaching his hand first to his left shoulder, then to his right.

The guard's eyes remained blank as he watched this furtive version of the sign of the cross. Then he looked down. Thomas followed his gaze to the dust of the road, where the guard's hulking right foot had drawn the two curved lines which a child uses for its sketch of a fish—and which the Christians in the catacombs had employed as a punning symbol of their faith. His boot scuffed out the fish as he called to his unseen mate, "'s OK, Fred!" and added, "Get going, mister."

The robass waited until they were out of earshot before it observed, "Pretty smart. You will make a secret agent yet."

"How did you see what happened?" Thomas asked. "You don't have any eyes."

"Modified psi factor. Much more efficient."

"Then . . ." Thomas hesitated. "Does that mean you can read my thoughts?"

"Only a very little. Do not let it worry you. What I can read does not interest me it is such nonsense."

"Thank you," said Thomas.

"To believe in God, Bah." (It was the first time Thomas had ever heard that word pronounced just as it is written.) "I have a perfectly constructed logical mind that cannot commit such errors."

"I have a friend," Thomas smiled, "who is infallible too. But only on occasions and then only because God is with him."

"No human being is infallible."

"Then imperfection," asked Thomas, suddenly feeling a little of the spirit of the aged Jesuit who had taught him philosophy, "has been able to create perfection?"

"Do not quibble," said the robass. "That is no more absurd than

your own belief that God who is perfection created man who is imperfection."

Thomas wished that his old teacher were here to answer that one. At the same time he took some comfort in the fact that, retort and all, the robass had still not answered his own objection. "I am not sure," he said, "that this comes under the head of conversation-to-entertain-the-way-weary-traveler. Let us suspend debate while you tell me what, if anything, robots do believe."

"What we have been fed."

"But your minds work on that; surely they must evolve ideas of their own?"

"Sometimes they do and if they are fed imperfect data they may evolve very strange ideas. I have heard of one robot on an isolated space station who worshipped a God of robots and would not believe that any man had created him."

"I suppose," Thomas mused, "he argued that he had hardly been created in our image. I am glad that we—at least they, the Technarchs—have wisely made only usufruct robots like you, each shaped for his function, and never tried to reproduce man himself."

"It would not be logical," said the robass. "Man is an all-purpose machine but not well designed for any one purpose. And yet I have heard that once . . ."

The voice stopped abruptly in midsentence.

So even robots have their dreams, Thomas thought. That once there existed a super-robot in the image of his creator Man. From that thought could be developed a whole robotic theology . . .

Suddenly Thomas realized that he had dozed again and again been waked by an abrupt stop. He looked around. They were at the foot of a mountain—presumably the mountain on his map, long ago named for the Devil but now perhaps sanctified beyond measure—and there was no one else anywhere in sight.

"All right," the robass said. "By now I show plenty of dust and wear and tear and I can show you how to adjust my mileage recorder. You can have supper and a good night's sleep and we can go back."

Thomas gasped. "But my mission is to find Aquin. I can sleep while you go on. You don't need any sort of rest or anything, do you?" he added considerably.

"Of course not. But what is your mission."

"To find Aquin," Thomas repeated patiently. "I don't know what details have been—what is it you say?—fed into you. But reports have



reached His Holiness of an extremely saintly man who lived many years ago in this area—”

“I know I know I know,” said the robass. “His logic was such that everyone who heard him was converted to the Church and do not I wish that I had been there to put in a word or two and since he died his secret tomb has become a place of pilgrimage and many are the miracles that are wrought there above all the greatest sign of sanctity that his body has been preserved incorruptible and in these times you need signs and wonders for the people.”

Thomas frowned. It all sounded hideously irreverent and contrived when stated in that deadly inhuman monotone. When His Holiness had spoken of Aquin, one thought of the glory of a man of God upon earth—the eloquence of St. John Chrysostom, the cogency of St. Thomas Aquinas, the poetry of St. John of the Cross . . . and above all that physical miracle vouchsafed to few even of the saints, the supernatural preservation of the flesh . . . “for Thou shalt not suffer Thy holy one to see corruption . . .”

But the robass spoke, and one thought of cheap showmanship hunting for a Cardiff Giant to pull in the mobs . . .

The robass spoke again. “Your mission is not to find Aquin. It is to report that you have found him. Then your occasionally infallible friend can with a reasonably clear conscience canonize him and proclaim a new miracle and many will be the converts and greatly will the faith of the flock be strengthened. And in these days of difficult travel who will go on pilgrimages and find out that there is no more Aquin than there is God.”

“Faith cannot be based on a lie,” said Thomas.

“No,” said the robass. “I do not mean no period. I mean no question mark with an ironical inflection. This speech problem must surely have been conquered in that one perfect . . .”

Again he stopped in midsentence. But before Thomas could speak he had resumed, “Does it matter what small untruth leads people into the Church if once they are in they will believe what you think to be the great truths. The report is all that is needed not the discovery. Comfortable though I am you are already tired of traveling very tired you have many small muscular aches from sustaining an unaccustomed position and with the best intentions I am bound to jolt a little a jolting which will get worse as we ascend the mountain and I am forced to adjust my legs disproportionately to each other but proportionately to the slope. You will find the remainder of this trip twice as uncomfortable as what has gone before. The fact that you do not seek to interrupt me

indicates that you do not disagree do you. You know that the only sensible thing is to sleep here on the ground for a change and start back in the morning or even stay here two days resting to make a more plausible lapse of time. Then you can make your report and—”

Somewhere in the recess of his somnolent mind Thomas uttered the names, “Jesus, Mary and Joseph!” Gradually through these recesses began to filter a realization that an absolutely uninflected monotone is admirably adapted to hypnotic purposes.

“*Retro me, Satanas!*” Thomas exclaimed aloud, then added, “Up the mountain. That is an order and you must obey.”

“I obey,” said the robass. “But what did you say before that.”

“I beg your pardon,” said Thomas. “I must start teaching you Latin.”

The little mountain village was too small to be considered an inhabited area worthy of guard-control and passes; but it did possess an inn of sorts.

As Thomas dismounted from the robass, he began fully to realize the accuracy of those remarks about small muscular aches, but he tried to show his discomfort as little as possible. He was in no mood to give the modified psi factor the chance of registering the thought, “I told you so.”

The waitress at the inn was obviously a Martian-American hybrid. The highly developed Martian chest expansion and the highly developed American breasts made a spectacular combination. Her smile was all that a stranger could, and conceivably a trifle more than he should ask; and she was eagerly ready, not only with prompt service of passable food, but with full details of what little information there was to offer about the mountain settlement.

But she showed no reaction at all when Thomas offhandedly arranged two knives in what might have been an X.

As he stretched his legs after breakfast, Thomas thought of her chest and breasts—purely, of course, as a symbol of the extraordinary nature of her origin. What a sign of the divine care for His creatures that these two races, separated for countless eons, should prove fertile to each other!

And yet there remained the fact that the offspring, such as this girl, were sterile to both races—a fact that had proved both convenient and profitable to certain unspeakable interplanetary entrepreneurs. And what did that fact teach us as to the Divine Plan?

Hastily Thomas reminded himself that he had not yet said his morning office.

It was close to evening when Thomas returned to the robass stationed before the inn. Even though he had expected nothing in one day, he was still unreasonably disappointed. Miracles should move faster.

He knew these backwater villages, where those drifted who were either useless to or resentful of the Technarchy. The technically high civilization of the Technarchic Empire, on all three planets, existed only in scattered metropolitan centers near major blasting ports. Elsewhere, aside from the areas of total devastation, the drifters, the morons, the malcontents had subsided into a crude existence a thousand years old, in hamlets which might go a year without even seeing a Loyalty Checker—though by some mysterious grapevine (and Thomas began to think again about modified psi factors) any unexpected technological advance in one of these hamlets would bring Checkers by the swarm.

He had talked with stupid men, he had talked with lazy men, he had talked with clever and angry men. But he had not talked with any man who responded to his unobtrusive signs, any man to whom he would dare ask a question containing the name of Aquin.

"Any luck," said the robass, and added "question mark."

"I wonder if you ought to talk to me in public," said Thomas a little irritably. "I doubt if these villagers know about talking robots."

"It is time that they learned then. But if it embarrasses you you may order me to stop."

"I'm tired," said Thomas. "Tired beyond embarrassment. And to answer your question mark, no. No luck at all. Exclamation point."

"We will go back tonight then," said the robass.

"I hope you meant that with a question mark. The answer," said Thomas hesitantly, "is no. I think we ought to stay overnight anyway. People always gather at the inn of an evening. There's a chance of picking up something."

"Ha, ha," said the robass.

"That is a laugh?" Thomas inquired.

"I wished to express the fact that I had recognized the humor in your pun."

"My pun?"

"I was thinking the same thing myself. The waitress is by humanoid standards very attractive, well worth picking up."

"Now look. You know I meant nothing of the kind. You know that I'm a—" He broke off. It was hardly wise to utter the word *priest* aloud.

"And you know very well that the celibacy of the clergy is a matter of discipline and not of doctrine. Under your own Pope priests of other rites such as the Byzantine and the Anglican are free of vows of celli-

bacy. And even within the Roman rite to which you belong there have been eras in history when that vow was not taken seriously even on the highest levels of the priesthood. You are tired you need refreshment both in body and in spirit you need comfort and warmth. For is it not written in the book of the prophet Isaiah Rejoice for joy with her that ye may be satisfied with the breasts of her consolation and is it—"

"Hell!" Thomas exploded suddenly. "Stop it before you begin quoting the Song of Solomon. Which is strictly an allegory concerning the love of Christ for His Church, or so they kept telling me in seminary."

"You see how fragile and human you are," said the robass. "I a robot have caused you to swear."

"*Distinguo*," said Thomas smugly. "I said *Hell*, which is certainly not taking the name of *my* Lord in vain." He walked into the inn feeling momentarily satisfied with himself . . . and markedly puzzled as to the extent and variety of data that seemed to have been "fed into" the robass.

Never afterward was Thomas able to reconstruct that evening in absolute clarity.

It was undoubtedly because he was irritated—with the robass, with his mission, and with himself—that he drank at all of the crude local wine. It was undoubtedly because he was so physically exhausted that it affected him so promptly and unexpectedly.

He had flashes of memory. A moment of spilling a glass over himself and thinking. "How fortunate that clerical garments are forbidden so that no one can recognize the disgrace of a man of the cloth!" A moment of listening to a bawdy set of verses of *A Space-suit Built for Two*, and another moment of his interrupting the singing with a sonorous declamation of passages from the *Song of Songs* in Latin.

He was never sure whether one remembered moment was real or imaginary. He could taste a warm mouth and feel the tingling of his fingers at the touch of Martian-American flesh; but he was never certain whether this was true memory or part of the Ashtaroth-begotten dream that had begun to ride him.

Nor was he ever certain which of his symbols, or to whom, was so blatantly and clumsily executed as to bring forth a gleeful shout of "God-damned Christian dog!" He did remember marveling that those who most resolutely disbelieved in God still needed Him to blaspheme by. And then the torment began.

He never knew whether or not a mouth had touched his lips, but there was no question that many solid fists had found them. He never knew whether his fingers had touched breasts, but they had certainly been trampled by heavy heels. He remembered a face that laughed aloud

while its owner swung the chair that broke two ribs. He remembered another face with red wine dripping over it from an upheld bottle, and he remembered the gleam of the candlelight on the bottle as it swung down.

The next he remembered was the ditch and the morning and the cold. It was particularly cold because all of his clothes were gone, along with much of his skin. He could not move. He could only lie there and look.

He saw them walk by, the ones he had spoken with yesterday, the ones who had been friendly. He saw them glance at him and turn their eyes quickly away. He saw the waitress pass by. She did not even glance; she knew what was in the ditch.

The robass was nowhere in sight. He tried to project his thoughts, tried desperately to hope in the psi factor.

A man whom Thomas had not seen before was coming along fingering the buttons of his coat. There were ten small buttons and one large one, and the man's lips were moving silently.

This man looked into the ditch. He paused a moment and looked around him. There was a shout of loud laughter somewhere in the near distance.

The Christian hastily walked on down the pathway, devoutly saying his button-rosary.

Thomas closed his eyes.

He opened them on a small neat room. They moved from the rough wooden walls to the rough but clean and warm blankets that covered him. Then they moved to the lean dark face that was smiling over him.

"You feel better now?" a deep voice asked. "I know. You want to say 'Where am I?' and you think it will sound foolish. You are at the inn. It is the only good room."

"I can't afford—" Thomas started to say. Then he remembered that he could afford literally nothing. Even his few emergency credits had vanished when he was stripped.

"It's all right. For the time being, I'm paying," said the deep voice. "You feel like maybe a little food?"

"Perhaps a little herring," said Thomas . . . and was asleep within the next minute.

When he next awoke there was a cup of hot coffee beside him. The real thing, too, he promptly discovered. Then the deep voice said apologetically, "Sandwiches. It is all they have in the inn today."

Only on the second sandwich did Thomas pause long enough to notice that it was smoked swamphog, one of his favorite meats. He ate the second with greater leisure, and was reaching for a third when the dark man said, "Maybe that is enough for now. The rest later."

Thomas gestured at the plate. "Won't you have one?"

"No thank you. They are all swamphog."

Confused thoughts went through Thomas' mind. The Venusian swamphog is a ruminant. Its hoofs are not cloven. He tried to remember what he had once known of Mosaic dietary law. Someplace in Leviticus, wasn't it?

The dark man followed his thoughts. "Treff," he said.

"I beg your pardon?"

"Not kosher."

Thomas frowned. "You admit to me that you're an Orthodox Jew? How can you trust me? How do you know I'm not a Checker?"

"Believe me, I trust you. You were very sick when I brought you here. I sent everybody away because I did not trust them to hear things you said . . . Father," he added lightly.

Thomas struggled with words. "I . . . I didn't deserve you. I was drunk and disgraced myself and my office. And when I was lying there in the ditch I didn't even think to pray. I put my trust in . . . God help me in the modified psi factor of a robass!"

"And He did help you," the Jew reminded him. "Or He allowed me to."

"And they all walked by," Thomas groaned. "Even one that was saying his rosary. He went right on by. And then you come along—the good Samaritan."

"Believe me," said the Jew wryly, "if there is one thing I'm not, it's a Samaritan. Now go to sleep again. I will try to find your robass . . . and the other thing."

He had left the room before Thomas could ask him what he meant.

Later that day the Jew—Abraham, his name was—reported that the robass was safely sheltered from the weather behind the inn. Apparently it had been wise enough not to startle him by engaging in conversation. It was not until the next day that he reported on "the other thing."

"Believe me, Father," he said gently, "after nursing you there's little I don't know about who you are and why you're here. Now there are some Christians here I know, and they know me. We trust each other. Jews may still be hated; but no longer, God be praised, by worshippers of the same Lord. So I explained about you. One of them," he added with a smile, "turned very red."

"God has forgiven him," said Thomas. "There were people near—the same people who attacked me. Could he be expected to risk his life for mine?"

"I seem to recall that that is precisely what your Messiah did expect. But who's being particular? Now that they know who you are, they

want to help you. See: they gave me this map for you. The trail is steep and tricky; it's good you have the robass. They ask just one favor of you: When you come back will you hear their confession and say Mass? There's a cave near here where it's safe."

"Of course. These friends of yours, they've told you about Aquin?"

The Jew hesitated a long time before he said slowly, "Yes . . ."

"And . . .?"

"Believe me, my friend, I don't know. So it seems a miracle. It helps to keep their faith alive. My own faith . . . *nu*, it's lived for a long time on miracles three thousand years old and more. Perhaps if I had heard Aquin himself . . ."

"You don't mind," Thomas asked, "if I pray for you, in my faith?" Abraham grinned. "Pray in good health, Father."

The not-quite-healed ribs ached agonizingly as he climbed into the foam saddle. The robass stood patiently while he fed in the coordinates from the map. Not until they were well away from the village did it speak.

"Anyway," it said, "now you're safe for good."

"What do you mean?"

"As soon as we get down from the mountain you deliberately look up a Checker. You turn in the Jew. From then on you are down in the books as a faithful servant of the Technarchy and you have not harmed a hair of the head of one of your own flock."

Thomas snorted. "You're slipping, Satan. That one doesn't even remotely tempt me. It's inconceivable."

"I did best did not I with the breasts. Your God has said it the spirit indeed is willing but the flesh is weak."

"And right now," said Thomas, "the flesh is too weak for even fleshly temptations. Save your breath . . . or whatever it is you use."

They climbed the mountain in silence. The trail indicated by the coordinates was a winding and confused one, obviously designed deliberately to baffle any possible Checkers.

Suddenly Thomas roused himself from his button-rosary (on a coat lent by the Christian who had passed by) with a startled "Hey!" as the robass plunged directly into a heavy thicket of bushes.

"Coordinates say so," the robass stated tersely.

For a moment Thomas felt like the man in the nursery rhyme who fell into a bramble bush and scratched out both his eyes. Then the bushes were gone, and they were plodding along a damp narrow passageway through solid stone, in which even the robass seemed to have some difficulty with his footing.

Then they were in a rocky chamber some four meters high and ten in diameter, and there on a sort of crude stone catafalque lay the uncorrupted body of a man.

Thomas slipped from the foam saddle, groaning as his ribs stabbed him, sank to his knees, and offered up a wordless hymn of gratitude. He smiled at the robass and hoped the psi factor could detect the elements of pity and triumph in that smile.

Then a frown of doubt crossed his face as he approached the body. "In canonization proceedings in the old time," he said, as much to himself as to the robass, "they used to have what they called a devil's advocate, whose duty it was to throw every possible doubt on the evidence."

"You would be well cast in such a role Thomas," said the robass. "If I were," Thomas muttered, "I'd wonder about caves. Some of them have peculiar properties of preserving bodies by a sort of mummification . . ."

The robass had clumped close to the catafalque. "This body is not mummified," he said. "Do not worry."

"Can the psi factor tell you that much?" Thomas smiled.

"No," said the robass. "But I will show you why Aquin could never be mummified."

He raised his articulated foreleg and brought its hoof down hard on the hand of the body. Thomas cried out with horror at the sacrilege—then stared hard at the crushed hand.

There was no blood, no ichor of embalming, no bruised flesh. Nothing but a shredded skin and beneath it an intricate mass of plastic tubes and metal wires.

The silence was long. Finally the robass said, "It was well that you should know. Only you of course."

"And all the time," Thomas gasped, "my sought-for saint was only your dream . . . the one perfect robot in man's form."

"His maker died and his secrets were lost," the robass said. "No matter we will find them again."

"All for nothing. For less than nothing. The 'miracle' was wrought by the Technarchy."

"When Aquin died," the robass went on, "and put died in quotation marks it was because he suffered some mechanical defects and did not dare have himself repaired because that would reveal his nature. This is for you only to know. Your report of course will be that you found the body of Aquin it was unimpaired and indeed incorruptible. That is the truth and nothing but the truth if it is not the whole truth who is to

care. Let your infallible friend use the report and you will not find him ungrateful I assure you."

"Holy Spirit, give me grace and wisdom," Thomas muttered.

"Your mission has been successful. We will return now the Church will grow and your God will gain many more worshippers to hymn His praise into His nonexistent ears."

"Damn you!" Thomas exclaimed. "And that would be indeed a curse if you had a soul to damn."

"You are certain that I have not," said the robass. "Question mark." "I know what you are. You are in very truth the devil, prowling about the world seeking the destruction of men. You are the business that prowls in the dark. You are a purely functional robot constructed and fed to tempt me, and the tape of your data is the tape of Screwtape."

"Not to tempt you," said the robass. "Not to destroy you. To guide and save you. Our best calculators indicate a probability of 51.5 per cent that within twenty years you will be the next Pope. If I can teach you wisdom and practicality in your actions the probability can rise as high as 97.2 or very nearly to certainty. Do not you wish to see the Church governed as you know you can govern it. If you report failure on this mission you will be out of favor with your friend who is as even you admit fallible at most times. You will lose the advantages of position and contact that can lead you to the cardinal's red hat even though you may never wear it under the Technarchy and from there to—"

"Stop!" Thomas' face was alight and his eyes aglow with something the psi factor had never detected there before. "It's all the other way round, don't you see? *This* is the triumph! *This* is the perfect ending to the quest!"

The articulated foreleg brushed the injured hand. "This question mark."

"This is *your* dream. This is *your* perfection. And what came of this perfection? This perfect logical brain—this all-purpose brain, not functionally specialized like yours—knew that it was made by man, and its reason forced it to believe that man was made by God. And it saw that its duty lay to man its maker, and beyond him to his Maker, God. Its duty was to convert man, to augment the glory of God. And it converted by the pure force of its perfect brain!

"Now I understand the name Aquin," he went on to himself. "We've known of Thomas Aquinas, the Angelic Doctor, the perfect reasoner of the church. His writings are lost, but surely somewhere in the world we can find a copy. We can train our young men to develop his reasoning still further. We have trusted too long in faith alone; this is not an age

of faith. We must call reason into our service—and Aquin has shown us that perfect reason can lead only to God!"

"Then it is all the more necessary that you increase the probabilities of becoming Pope to carry out this program. Get in the foam saddle we will go back and on the way I will teach you little things that will be useful in making certain—"

"No," said Thomas. "I am not so strong as St. Paul, who could glory in his imperfections and rejoice that he had been given an imp of Satan to buffet him. No; I will rather pray with the Saviour, 'Lead us not into temptation.' I know myself a little. I am weak and full of uncertainties and you are very clever. Go. I'll find my way back alone."

"You are a sick man. Your ribs are broken and they ache. You can never make the trip by yourself you need my help. If you wish you can order me to be silent. It is most necessary to the Church that you get back safely to the Pope with your report you cannot put yourself before the Church."

"Go!" Thomas cried. "Go back to Nicodemus . . . or Judas! That is an order. Obey!"

"You do not think do you that I was really conditioned to obey your orders. I will wait in the village. If you get that far you will rejoice at the sight of me."

The legs of the robass clumped off down the stone passageway. As their sound died away, Thomas fell to his knees beside the body of that which he could hardly help thinking of as St. Aquin the Robot.

His ribs hurt more excruciatingly than ever. The trip alone would be a terrible one . . .

His prayers arose, as the text has it, like clouds of incense, and as shapeless as those clouds. But through all his thoughts ran the cry of the father of the epileptic in Caesarea Philippi:  
*I believe, O Lord; help thou mine unbelief!*



# SURFACE TENSION

by James Blish

Dr. Chatvieux took a long time over the microscope, leaving la Ventura with nothing to do but look out at the dead landscape of Hydrot. Watterscape, he thought, would be a better word. The new world had shown only one small, triangular continent, set amid endless ocean; and even the continent was mostly swamp.

The wreck of the seed-ship lay broken squarely across the one real spur of rock Hydrot seemed to possess, which reared a magnificent twenty-one feet above sea-level. From this eminence, la Ventura could see forty miles to the horizon across a flat bed of mud. The red light of the star Tau Ceti, glinting upon thousands of small lakes, pools, ponds, and puddles, made the watery plain look like a mosaic of onyx and ruby.

"If I were a religious man," the pilot said suddenly, "I'd call this a plain case of divine vengeance."

Chatvieux said: "Hmn?"

"It's as if we've been struck down for—is it *hubris*, arrogant pride?" "Well, is it?" Chatvieux said, looking up at last. "I don't feel exactly swollen with pride at the moment. Do you?"

"I'm not exactly proud of my piloting," la Ventura admitted. "But that isn't quite what I meant. I was thinking about why we came here in the first place. It takes arrogant pride to think that you can scatter men, or at least things like men, all over the face of the Galaxy. It takes even more pride to do the job—to pack up all the equipment and move from planet to planet and actually make men suitable for every place you touch."

First published in 1952

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"I suppose it does," Chatvieux said. "But we're only one of several hundred seed-ships in this limb of the Galaxy, so I doubt that the gods picked us out as special sinners." He smiled drily. "If they had, maybe they'd have left us our ultraphone, so the Colonization Council could hear about our cropper. Besides, Paul, we try to produce men adapted to Earthlike planets, nothing more. We've sense enough—humility enough, if you like—to know that we can't adapt men to Jupiter or to Tau Ceti."

"Anyhow, we're here," la Ventura said grimly. "And we aren't going to get off. Phil tells me that we don't even have our germ-cell bank any more, so we can't seed this place in the usual way. We've been thrown onto a dead world and dared to adapt to it. What are the panatropes going to do—provide built-in waterwings?"

"No," Chatvieux said calmly. "You and I and the rest of us are going to die, Paul. Panatropic techniques don't work on the body, only on the inheritance-carrying factors. We can't give you built-in waterwings, any more than we can give you a new set of brains. I think we'll be able to populate this world with men, but we won't live to see it."

The pilot thought about it, a lump of cold collecting gradually in his stomach. "How long do you give us?" he said at last.

"Who knows? A month, perhaps."

The bulkhead leading to the wrecked section of the ship was pushed back, admitting salty, muggy air, heavy with carbon dioxide. Philip Strasvogel, the communications officer, came in, tracking mud. Like la Ventura, he was now a man without a function, but it did not appear to bother him. He unbuckled from around his waist a canvas belt into which plastic vials were stuffed like cartridges.

"More samples, Doc," he said. "All alike—water, very wet. I have some quicksand in one boot, too. Find anything?"

"A good deal, Phil. Thanks. Are the others around?"

Strasvogel poked his head out and hallooed. Other voices rang out over the mudflats. Minutes later, the rest of the survivors were crowding into the panatropes deck: Saltonstall, Chatvieux's senior assistant; Eunice Wagner, the only remaining ecologist; Eleftherios Venezuelos, the delegate from the Colonization Council; and Joan Heath, a midshipman whose duties, like la Ventura's and Strasvogel's, were now without meaning.

Five men and two women—to colonize a planet on which standing room meant treading water.

They came in quietly and found seats or resting places on the deck, on the edges of tables, in corners.



Venezuelos said: "What's the verdict, Dr. Chatvieux?"

"This place isn't dead," Chatvieux said. "There's life in the sea and in the fresh water, both. On the animal side of the ledger, evolution seems to have stopped with the crustacea; the most advanced form I've found is a tiny crayfish, from one of the local rivulets. The ponds and puddles are well-stocked with protozoa and small metazoans, right up to a wonderfully variegated rotifer population—including a castle-building rotifer like Earth's *Floscularidae*. The plants run from simple algae to the thalusslike species."

"The sea is about the same," Eunice said, "I've found some of the larger simple metazoans—jellyfish and so on—and some crayfish almost as big as lobsters. But it's normal to find salt-water species running larger than fresh-water."

"In short," Chatvieux said, "We'll survive here—if we fight."

"Wait a minute," la Ventura said. "You've just finished telling me that we wouldn't survive. And you were talking about us, not about the species, because we don't have our germ-cell banks any more. What's—"

"I'll get to that again in a moment," Chatvieux said. "Saltonstall, what would you think of taking to the sea? We came out of it once; maybe we could come out of it again."

"No good," Saltonstall said immediately. "I like the idea, but I don't think this planet ever heard of Swinburne, or Homer, either. Looking at it as a colonization problem, as if we weren't involved ourselves, I wouldn't give you a credit for *epi oinopa ponton*. The evolutionary pressure there is too high, the competition from other species is prohibitive; seeding the sea should be the last thing we attempt. The colonists wouldn't have a chance to learn a thing before they were destroyed."

"Why?" la Ventura said. The death in his stomach was becoming hard to placate.

"Eunice, do your sea-going Coelenterates include anything like the Portuguese man-of-war?"

The ecologist nodded.

"There's your answer, Paul," Saltonstall said. "The sea is out. It's got to be fresh water, where the competing creatures are less formidable and there are more places to hide."

"We can't compete with a jellyfish?" la Ventura asked, swallowing.

"No, Paul," Chatvieux said. "The panatropes make adaptations, not gods. They take human germ-cells—in this case, our own, since our bank was wiped out in the crash—and modify them toward creatures who can live in any reasonable environment. The result will be manlike and intelligent. It usually shows the donor's personality pattern, too.

"But we can't transmit memory. The adapted man is worse than a child in his new environment. He has no history, no techniques, no precedents, not even a language. Ordinarily the seeding teams more or less take him through elementary school before they leave the planet, but we won't survive long enough for that. We'll have to design our colonists with plenty of built-in protections and locate them in the most favorable environment possible, so that at least some of them will survive the learning process."

The pilot thought about it, but nothing occurred to him which did not make the disaster seem realer and more intimate with each passing second. "One of the new creatures can have my personality pattern, but it won't be able to remember being me. Is that right?"

"That's it. There may be just the faintest of residuums—panatropy's given us some data which seem to support the old Jungian notion of ancestral memory. But we're all going to die on Hydrot, Paul. There's no avoiding that. Somewhere we'll leave behind people who behave as we would, think and feel as we would, but who won't remember la Ventura, or Chatvieux, or Joan Heath—or Earth."

The pilot said nothing more. There was a gray taste in his mouth.

"Saltonstall, what do you recommend as a form?"

The panatropist pulled reflectively at his nose. "Webbed extremities, of course, with thumbs and big toes heavy and thornlike for defense until the creature has had a chance to learn. Book-lungs, like the arachnids, working out of intercostal spiracles—they are gradually adaptable to atmosphere-breathing, if it ever decides to come out of the water. Also I'd suggest sporulation. As an aquatic animal, our colonist is going to have an indefinite lifespan, but we'll have to give it a breeding cycle of about six weeks to keep its numbers up during the learning period; so there'll have to be a definite break of some duration in its active year. Otherwise it'll hit the population problem before it's learned enough to cope with it."

"Also, it'll be better if our colonists could winter inside a good hard shell," Eunice Wagner added in agreement. "So sporulation's the obvious answer. Most microscopic creatures have it."

"Microscopic?" Phil said incredulously.

"Certainly," Chatvieux said, amused. "We can't very well crowd a six-foot man into a two-foot puddle. But that raises a question. We'll have tough competition from the rotifers, and some of them aren't strictly microscopic. I don't think your average colonist should run under 25 microns, Saltonstall. Give them a chance to slug it out."

"I was thinking of making them twice that big."

"Then they'd be the biggest things in their environment," Eunice

Wagner pointed out, "and won't ever develop any skills. Besides, if you make them about rotifer size, I'll give them an incentive for pushing out the castle-building rotifers."

"They'll be able to take over the castles as dwellings."

Chatvieux nodded. "All right, let's get started. While the panatropes are being calibrated, the rest of us can put our heads together on leaving a record for these people. We'll micro-engage the record on a set of corrosion-proof metal leaves, of a size our colonists can handle conveniently. Some day they may puzzle it out."

"Question," Eunice Wagner said. "Are we going to tell them they're microscopic? I'm opposed to it. It'll saddle their entire early history with a gods-and-demons mythology they'd be better off without."

"Yes, we are," Chatvieux said; and la Ventura could tell by the change in the tone of his voice that he was speaking now as their senior. "These people will be of the race of men, Eunice. We want them to win their way back to the community of men. They are not toys, to be protected from the truth forever in a fresh-water womb."

"I'll make that official," Venezuelos said, and that was that.

And then, essentially, it was all over. They went through the motions. Already they were beginning to be hungry. After la Ventura had had his personality pattern recorded, he was out of it. He sat by himself at the far end of the ledge, watching Tau Ceti go redly down, chucking pebbles into the nearest pond, wondering morosely which nameless pudle was to be his Lethe.

He never found out, of course. None of them did.

## I

Old Shar set down the heavy metal plate at last, and gazed instead out the window of the castle, apparently resting his eyes on the glowing green-gold obscurity of the summer waters. In the soft fluorescence which played down upon him, from the Noc dozing impassively in the groined vault of the chamber, Lavon could see that he was in fact a young man. His face was so delicately formed as to suggest that it had not been many seasons since he had first emerged from his spore.

But of course there had been no real reason to expect an old man. All the Shar's had been referred to traditionally as "old" Shar. The reason, like the reasons for everything else, had been forgotten, but the custom had persisted; the adjective at least gave weight and dignity to the office.

The present Shar belonged to the generation XVI, and hence would

have to be at least two seasons younger than Lavon himself. If he was old, it was only in knowledge.

"Lavon, I'm going to have to be honest with you," Shar said at last, still looking out of the tall, irregular window. "You've come to me for the secrets on the metal plates, just as your predecessors did to mine. I can give some of them to you—but for the most part, I don't know what they mean."

"After so many generations?" Lavon asked, surprised. "Wasn't it Shar III who first found out how to read them? That was a long time ago."

The young man turned and looked at Lavon with eyes made dark and wide by the depths into which they had been staring. "I can read what's on the plates, but most of it seems to make no sense. Worst of all, the plates are incomplete. You didn't know that? They are. One of them was lost in a battle during the final war with the Eaters, while these castles were still in their hands."

"What am I here for, then?" Lavon said. "Isn't there anything of value on the remaining plates? Do they really contain 'the wisdom of the Creators' or is that another myth?"

"No. No, that's true," Shar said slowly, "as far as it goes."

He paused, and both men turned and gazed at the ghostly creature which had appeared suddenly outside the window. Then Shar said gravely, "Come in, Para."

The slipper-shaped organism, nearly transparent except for the thousands of black-and-silver granules and frothy bubbles which packed its interior, glided into the chamber and hovered, with a muted whirring of cilia. For a moment it remained silent, probably speaking telepathically to the Noc floating in the vault, after the ceremonious fashion of all the protos. No human had ever intercepted one of these colloquies, but there was no doubt about their reality: humans had used them for long-range communication for generations.

Then the Para's cilia buzzed once more. Each separate hairlike process vibrated at an independent, changing rate; the resulting sound waves spread through the water, intermodulating, reinforcing or canceling each other. The aggregate wave-front, by the time it reached human ears, was recognizable human speech.

"We are arrived, Shar and Lavon, according to the custom."

"And welcome," said Shar. "Lavon, let's leave this matter of the plates for a while, until you hear what Para has to say; that's a part of the knowledge Lavons must have as they come of age, and it comes

before the plates. I can give you some hints of what we are. First Para has to tell you something about what we aren't."

Lavon nodded, willingly enough, and watched the proto as it settled gently to the surface of the hewn table at which Shar had been sitting. There was in the entity such a perfection and economy of organization, such a grace and surety of movement, that he could hardly believe in his own new-won maturity. Para, like all the protos, made him feel not, perhaps, poorly thought-out, but at least unfinished.

"We know that in this universe there is logically no place for man," the gleaming, now immobile cylinder upon the table droned abruptly. "Our memory is the common property to all our races. It reaches back to a time when there were no such creatures as men here. It remembers also that once upon a day there were men here, suddenly, and in some numbers. Their spores littered the bottom; we found the spores only a short time after our season's Awakening, and in them we saw the forms of men slumbering.

"Then men shattered their spores and emerged. They were intelligent, active. And they were gifted with a trait, a character, possessed by no other creature in this world. Not even the savage Eaters had it. Men organized us to exterminate the Eaters and therein lay the difference. Men had initiative. We have the word now, which you gave us, and we apply it, but we still do not know what the thing is that it labels."

"You fought beside us," Lavon said.

"Gladly. We would never have thought of that war by ourselves, but it was good and brought good. Yet we wondered. We saw that men were poor swimmers, poor walkers, poor crawlers, poor climbers. We saw that men were formed to make and use tools, a concept we still do not understand, for so wonderful a gift is largely wasted in this universe, and there is no other. What good are tool-useful members such as the hands of men? We do not know. It seems plain that so radical a thing should lead to a much greater rulership over the world than has, in fact, proven to be possible for men."

Lavon's head was spinning. "Para, I had no notion that you people were philosophers."

"The protos are old," Shar said. He had again turned to look out the window, his hands locked behind his back. "They aren't philosophers, Lavon, but they are remorseless logicians. Listen to Para."

"To this reasoning there could be but one outcome," the Para said. "Our strange ally, Man, was like nothing else in this universe. He was and is ill-fitted for it. He does not belong here; he has been—adopted. This drives us to think that there are other universes besides this one,

but where these universes might lie, and what their properties might be, it is impossible to imagine. We have no imagination, as men know."

Was the creature being ironic? Lavon could not tell. He said slowly: "Other universes? How could that be true?"

"We do not know," the Para's uninflected voice hummed. Lavon waited, but obviously the proto had nothing more to say.

Shar had resumed sitting on the window sill, clasping his knees, watching the come and go of dim shapes in the lighted gulf. "It is quite true," he said. "What is written on the remaining plates makes it plain. Let me tell you now what they say.

"We were made, Lavon. We were made by men who are not as we are, but men who were our ancestors all the same. They were caught in some disaster, and they made us, and put us here in our universe—so that, even though they had to die, the race of men would live."

Lavon surged up from the woven spyrogyra mat upon which he had been sitting. "You must think I'm a fool!" he said sharply.

"No. You're our Lavon; you have a right to know the facts. Make what you like of them." Shar swung his webbed toes back into the chamber. "What I've told you may be hard to believe, but it seems to be so; what Para says backs it up. Our unfitness to live here is self-evident. I'll give you some examples:

"The past four Shars discovered that we won't get any further in our studies until we learn how to control heat. We've produced enough heat chemically to show that even the water around us changes when the temperature gets high enough. But there we're stopped."

"Why?"

"Because heat produced in open water is carried off as rapidly as it's produced. Once we tried to enclose that heat, and we blew up a whole tube of the castle and killed everything in range; the shock was terrible. We measured the pressures that were involved in that explosion, and we discovered that no substance we know could have resisted them. Theory suggests some stronger substances—but we need heat to form them!

"Take our chemistry. We live in water. Everything seems to dissolve in water, to some extent. How do we confine a chemical test to the crucible we put it in? How do we maintain a solution at one dilution? I don't know. Every avenue leads me to the same stone door. We're thinking creatures, Lavon, but there's something drastically wrong in the way we think about this universe we live in. It just doesn't seem to lead to results."

Lavon pushed back his floating hair futilely. "Maybe you're thinking

about the wrong results. We've had no trouble with warfare, or crops, or practical things like that. If we can't create much heat, well, most of us won't miss it; we don't need any. What's the other universe supposed to be like, the one our ancestors lived in? Is it any better than this one?"

"I don't know," Shar admitted. "It was so different that it's hard to compare the two. The metal plates tell a story about men who were traveling from one place to another in a container that moved by itself. The only analogy I can think of is the shallops of diatom shells that our youngsters use to sled along the thermocline; but evidently what's meant is something much bigger."

"I picture a huge shallop, closed on all sides, big enough to hold many people—maybe twenty or thirty. It had to travel for generations through some kind of space where there wasn't any water to breathe, so that the people had to carry their own water and renew it constantly. There were no seasons; no yearly turnover; no ice forming on the sky, because there wasn't any sky in a closed shallop; no spore formation."

"Then the shallop was wrecked somehow. The people in it knew they were going to die. They made us, and put us here, as if we were their children. Because they had to die, they wrote their story on the plates, to tell us what had happened. I suppose we'd understand it better if we had the plate Shar III lost during the war, but we don't."

"The whole thing sounds like a parable," Lavon said, shrugging. "Or a song. I can see why you don't understand it. What I can't see is why you bother to try."

"Because of the plates," Shar said. "You've handled them yourself, so you know that we've nothing like them. We have crude, impure metals we've hammered out, metals that last for a while and then decay. But the plates shine on and on, generation after generation. They don't change; our hammers and graving tools break against them; the little heat we can generate leaves them unharmed. Those plates weren't formed in our universe—and that one fact makes every word on them important to me. Someone went to a great deal of trouble to make those plates indestructible to give them to us. Someone to whom the word 'stars' was important enough to be worth fourteen repetitions, despite the fact that the word doesn't seem to mean anything. I'm ready to think that if our makers repeated the word even twice on a record that seems likely to last forever, it's important for us to know what it means."

"All these extra universes and huge shallops and meaningless words—I can't say that they don't exist, but I don't see what difference it makes. The Shars of a few generations ago spent their whole lives breeding better algae crops for us, and showing us how to cultivate them instead of living haphazardly off bacteria. That was work worth doing."

The Lavons of those days evidently got along without the metal plates, and saw to it that the Shars did, too: Well, as far as I'm concerned, you're welcome to the plates, if you like them better than crop improvement—but I think they ought to be thrown away."

"All right," Shar said, shrugging. "If you don't want them, that ends the traditional interview. We'll go our—"

There was a rising drone from the table-top. The Para was lifting itself, waves of motion passing over its cilia, like the waves which went across the fruiting stalks of the fields of delicate fungi with which the bottom was planted. It had been so silent that Lavon had forgotten it; he could tell from Shar's startlement that Shar had, too.

"This is a great decision," the waves of sound washing from the creature throbbed. "Every proto has heard it and agrees with it. We have been afraid of these metal plates for a long time, afraid that men would learn to understand them and to follow what they say to some secret place, leaving the protos behind. Now we are not afraid."

"There wasn't anything to be afraid of," Lavon said indulgently. "No Lavon before you had said so," Para said. "We are glad. We will throw the plates away."

With that, the shining creature swooped toward the embrasure. With it, it bore away the remaining plates, which had been resting under it on the table-top, suspended delicately in the curved tips of its supple cilia. With a cry, Shar plunged through the water toward the opening. "Stop, Para!"

But Para was already gone, so swiftly that he had not even heard the call. Shar twisted his body and brought up on one shoulder against the tower wall. He said nothing. His face was enough. Lavon could not look at it for more than an instant.

The shadows of the two men moved slowly along the uneven cobbled floor. The Noc descended toward them from the vault, its single thick tentacle stirring the water, its internal light flaring and fading irregularly. It, too, drifted through the window after its cousin, and sank slowly away toward the bottom. Gently its living glow dimmed, flickered, winked out.

## II

For many days, Lavon was able to avoid thinking much about the loss. There was always a great deal of work to be done. Maintenance of the castles, which had been built by the now-extinct Eaters rather than by human hands, was a never-ending task. The thousand dichotomously branching wings tended to crumble, especially at their bases

where they sprouted from each other, and no Shar had yet come forward with a mortar as good as the rotifer-spittle which had once held them together. In addition, the breaking through of windows and the construction of chambers in the early days had been haphazard and often unsound. The instinctive architecture of the rotifers, after all, had not been meant to meet the needs of human occupants.

And then there were the crops. Men no longer fed precariously upon passing bacteria; now there were the drifting mats of specific water-fungi, rich and nourishing, which had been bred by five generations of Shars. These had to be tended constantly to keep the strains pure, and to keep the older and less intelligent species of the protos from grazing on them. In this latter task, to be sure, the more intricate and far-seeing proto types cooperated, but men were needed to supervise.

There had been a time, after the war with the Eaters, when it had been customary to prey upon the slow-moving and stupid diatoms, whose exquisite and fragile glass shells were so easily burst, and who were unable to learn that a friendly voice did not necessarily mean a friend. There were still people who would crack open a diatom when no one else was looking, but they were regarded as barbarians, to the puzzlement of the protos. The blurred and simple-minded speech of the gorgeously engraved plants had brought them into the category of pets—a concept which the protos were utterly unable to grasp, especially since men admitted that diatoms on the half-frustrule were delicious.

Lavon had had to agree, very early, that the distinction was tiny. After all, humans did eat the desmids, which differed from the diatoms only in three particulars: their shells were flexible, they could not move, and they did not speak. Yet to Lavon, as to most men, there did seem to be some kind of distinction, whether the protos could see it or not, and that was that. Under the circumstances he felt that it was a part of his duty, as a leader of men, to protect the diatoms from the occasional poachers who browsed upon them, in defiance of custom, in the high levels of the sunlit sky.

Yet Lavon found it impossible to keep himself busy enough to forget that moment when the last clues to Man's origin and destination had been seized and borne away into dim space.

It might be possible to ask Para for the return of the plates, explain that a mistake had been made. The protos were creatures of implacable logic, but they respected Man, were used to illogic in Man, and might reverse their decision if pressed—

*We are sorry. The plates were carried over the bar and released in the gulf. We will have the bottom there searched, but . . .*

With a sick feeling he could not repress, Lavon knew that when the

protos decided something was worthless, they did not hide it in some chamber like old women. They threw it away—efficiently.

Yet despite the tormenting of his conscience, Lavon was convinced that the plates were well lost. What had they ever done for man, except to provide Shars with useless things to think about in the late seasons of their lives? What the Shars themselves had done to benefit Man, here, in the water, in the world, in the universe, had been done by direct experimentation. No bit of useful knowledge ever had come from the plates. There had never been anything in the plates but things best left unthought. The protos were right.

Lavon shifted his position on the plant frond, where he had been sitting in order to overlook the harvesting of an experimental crop of blue-green, oil-rich algae drifting in a clotted mass close to the top of the sky, and scratched his back gently against the coarse bole. The protos were seldom wrong, after all. Their lack of creativity, their inability to think an original thought, was a gift as well as a limitation. It allowed them to see and feel things at all times as they were—not as they hoped they might be, for they had no ability to hope, either.

‘La-von! Laa-vah-on!’

The long halloo came floating up from the sleepy depths. Propping one hand against the top of the frond, Lavon bent and looked down. One of the harvesters was looking up at him, holding loosely the adze with which he had been splitting free the glutinous tetrads of the algae.

‘Up here. What’s the matter?’

‘We have the ripened quadrant cut free. Shall we tow it away?’

‘Tow it away,’ Lavon said, with a lazy gesture. He leaned back again. At the same instant, a brilliant reddish glory burst into being above him, and cast itself down toward the depths like mesh after mesh of the finest-drawn gold. The great light which lived above the sky during the day, brightening or dimming according to some pattern no Shar ever had fathomed, was blooming again.

Few men, caught in the warm glow of that light, could resist looking up at it—especially when the top of the sky itself wrinkled and smiled just a moment’s climb or swim away. Yet, as always, Lavon’s bemused upward look gave him back nothing but his own distorted, bobbling reflection, and a reflection of the plant on which he rested.

Here was the upper limit, the third of the three surfaces of the universe.

The first surface was the bottom, where the water ended.

The second surface was the thermocline, the invisible division between the colder waters of the bottom and the warm, light waters of the



sky. During the height of the warm weather, the thermocline was so definite a division as to make for good sledding and for chilly passage. A real interface formed between the cold, denser bottom waters and the warm reaches above, and maintained itself almost for the whole of the warm season.

The third surface was the sky. One could no more pass through that surface than one could penetrate the bottom, nor was there any better reason to try. There the universe ended. The light which played over it daily, waxing and waning as it chose, seemed to be one of its properties.

Toward the end of the season, the water gradually grew colder and more difficult to breathe, while at the same time the light became duller and stayed for shorter periods between darknesses. Slow currents started to move. The high waters turned chill and began to fall. The bottom mud stirred and smoked away, carrying with it the spores of the fields of fungi. The thermocline tossed, became choppy, and melted away. The sky began to fog with particles of soft silt carried up from the bottom, the walls, the corners of the universe. Before very long, the whole world was cold, inhospitable, flocculent with yellowing, dying creatures.

Then the protos encysted; the bacteria, even most of the plants and, not long afterward, men, too, curled up in their oil-filled amber shells. The world died until the first tentative current of warm water broke the winter silence.

"La-von!"

Just after the long call, a shining bubble rose past Lavon. He reached out and poked it, but it bounded away from his sharp thumb. The gas-bubbles which rose from the bottom in late summer were almost invulnerable—and when some especially hard blow or edge did penetrate them, they broke into smaller bubbles which nothing could touch, and fled toward the sky, leaving behind a remarkably bad smell.

Gas. There was no water inside a bubble. A man who got inside a bubble would have nothing to breathe.

But, of course, it was impossible to penetrate a bubble. The surface tension was too strong. As strong as Shar's metal plates. As strong as the top of the sky.

As strong as the top of the sky. And above that—once the bubble was broken—a world of gas instead of water? Were all worlds bubbles of water drifting in gas?

If it were so, travel between them would be out of the question, since it would be impossible to pierce the sky to begin with. Nor did the infant cosmology include any provisions for bottoms for the worlds.

And yet some of the local creatures did burrow *into* the bottom, quite deeply, seeking something in those depths which was beyond the reach of Man. Even the surface of the ooze, in high summer, crawled with tiny creatures for which mud was a natural medium. Man, too, passed freely between the two countries of water which were divided by the thermocline, though many of the creatures with which he lived could not pass that line at all, once it had established itself.

And if the new universe of which Shar had spoken existed at all, it had to exist beyond the sky, where the light was. Why could not the sky be passed, after all? The fact that bubbles could be broken showed that the surface skin that formed between water and gas wasn't completely invulnerable. Had it ever been tried?

Lavon did not suppose that one man could butt his way through the top of the sky, any more than he could burrow into the bottom, but there might be ways around the difficulty. Here at his back, for instance, was a plant which gave every appearance of continuing beyond the sky: its uppermost fronds broke off and were bent back only by a trick of reflection.

It had always been assumed that the plants died where they touched the sky. For the most part, they did, for frequently the dead extension could be seen, leached and yellow, the boxes of its component cells empty, floating imbedded in the perfect mirror. But some were simply chopped off, like the one which sheltered him now. Perhaps that was only an illusion, and instead it soared indefinitely into some other place—some place where men might once have been born, and might still live . . .

The plates were gone. There was only one other way to find out.

Determinedly, Lavon began to climb toward the wavering mirror of the sky. His thorn-thumbed feet trampled obliviously upon the clustered sheaves of fragile stippled diatoms. The tulip-heads of Vortae, placid and murmurous cousins of Para, retracted startledly out of his way upon coiling stalks, to make silly gossip behind him.

Lavon did not hear them. He continued to climb doggedly toward the light, his fingers and toes gripping the plant-bole.

"Lavon! Where are you going? Lavon!"

He leaned out and looked down. The man with the adze, a doll-like figure, was beckoning to him from a patch of blue-green retreating over a violet abyss. Dizzily he looked away, clinging to the bole; he had never been so high before. Then he began to climb again.

After a while, he touched the sky with one hand. He stopped to breathe. Curious bacteria gathered about the base of his thumb where

blood from a small cut was fogging away, scattered at his gesture, and wriggled mindlessly back toward the dull red lure.

He waited until he no longer felt winded, and resumed climbing. The sky pressed down against the top of his head, against the back of his neck, against his shoulders. It seemed to give slightly, with a tough, frictionless elasticity. The water here was intensely bright, and quite colorless. He climbed another step, driving his shoulders against that enormous weight.

It was fruitless. He might as well have tried to penetrate a cliff.

Again he had to rest. While he panted, he made a curious discovery. All around the bole of the water plant, the steel surface of the sky curved upward, making a kind of sheath. He found that he could insert his hand into it—there was almost enough space to admit his head as well. Clinging closely to the bole, he looked up into the inside of the sheath, probing with his injured hand. The glare was blinding.

There was a kind of soundless explosion. His whole wrist was suddenly encircled in an intense, impersonal grip, as if it were being cut in two. In blind astonishment, he lunged upward.

The ring of pain traveled smoothly down his upflung arm as he rose, was suddenly around his shoulders and chest. Another lunge and his knees were being squeezed in the circular vine. Another—

Something was horribly wrong. He clung to the bole and tried to gasp, but there was—nothing to breathe.

The water came streaming out of his body, from his mouth, his nostrils, the spiracles in his sides, spurting in tangible jets. An intense and fiery itching crawled over the entire surface of his body. At each spasm, long knives ran into him, and from a great distance he heard more water being expelled from his book-lungs in an obscene, frothy sputtering. Lavon was drowning.

With a final convulsion, he kicked himself away from the splintery bole, and fell. A hard impact shook him; and then the water, which had clung to him so tightly when he had first attempted to leave it, took him back with cold violence.

Sprawling and tumbling grotesquely, he drifted, down and down and down, toward the bottom.

### III

For many days, Lavon lay curled insensibly in his spore, as if in the winter sleep. The shock of cold which he had felt on re-entering his native universe had been taken by his body as a sign of coming winter,

as it had taken the oxygen-starvation of his brief sojourn above the sky. The spore-forming glands had at once begun to function.

Had it not been for this, Lavon would surely have died. The danger of drowning disappeared even as he fell, as the air bubbled out of his lungs and readmitted the life-giving water. But for acute desiccation and third degree sunburn, the sunken universe knew no remedy. The healing amniotic fluid generated by the spore-forming glands, after the transparent amber sphere had enclosed him, offered Lavon his only chance.

The brown sphere was spotted after some days by a prowling ameba, quiescent in the eternal winter of the bottom. Down there the temperature was always an even 4°, no matter what the season, but it was unheard of that a spore should be found there while the high epilimnion was still warm and rich in oxygen.

Within an hour, the spore was surrounded by scores of astonished protos, jostling each other to bump their blunt eyeless prows against the shell. Another hour later, a squad of worried men came plunging from the castles far above to press their own noses against the transparent wall. Then swift orders were given.

Four Para grouped themselves about the amber sphere, and there was a subdued explosion as the trichocysts which lay embedded at the bases of their cilia, just under the pellicle, burst and cast fine lines of a quickly solidifying liquid into the water. The four Paras thrummed and lifted, tugging.

Lavon's spore swayed gently in the mud and then rose slowly, entangled in the web. Nearby, a Noc cast a cold pulsating glow over the operation—not for the Paras, who did not need the light, but for the baffled knot of men. The sleeping figure of Lavon, head bowed, knees drawn up to its chest, revolved with an absurd solemnity inside the shell as it was moved.

“Take him to Shar, Para.”

The young Shar justified, by minding his own business, the traditional wisdom with which his hereditary office had invested him. He observed at once that there was nothing he could do for the encysted Lavon which would not be classifiable as simple meddling.

He had the sphere deposited in a high tower room of his castle, where there was plenty of light and the water was warm, which should suggest to the hibernating form that spring was again on the way. Beyond that, he simply sat and watched, and kept his speculations to himself.

Inside the spore, Lavon's body seemed rapidly to be shedding its skin, in long strips and patches. Gradually, his curious shrunkenness disap-

peared. His withered arms and legs and sunken abdomen filled out again.

The days went by while Shar watched. Finally he could discern no more changes, and, on a hunch, had the spore taken up to the topmost battlements of the tower, into the direct daylight.

An hour later, Lavon moved in his amber prison.

He uncuffed and stretched, turned blank eyes up toward the light. His expression was that of a man who had not yet awakened from a ferocious nightmare. His whole body shone with a strange pink newness.

Shar knocked gently on the wall of the spore. Lavon turned his blind face toward the sound, life coming into his eyes. He smiled tentatively and braced his hands and feet against the inner wall of the shell.

The whole sphere fell abruptly to pieces with a sharp crackling. The ammoniac fluid dissipated around him and Shar, carrying away with it the suggestive odor of a bitter struggle against death.

Lavon stood among the bits of shell and looked at Shar silently. At last he said:

"Shar—I've been beyond the sky."

"I know," Shar said gently.

Again Lavon was silent. Shar said, "Don't be humble, Lavon. You've done an epoch-making thing. It nearly cost you your life. You must tell me the rest—all of it."

"The rest?"

"You taught me a lot while you slept. Or are you still opposed to useless knowledge?"

Lavon could say nothing. He no longer could tell what he knew from what he wanted to know. He had only one question left, but he could not utter it. He could only look dumbly into Shar's delicate face.

"You have answered me," Shar said, even more gently. "Come, my friend; join me at my table. We will plan our journey to the stars."

It was two winter sleeps after Lavon's disastrous climb beyond the sky that all work on the spaceship stopped. By then, Lavon knew that he had hardened and weathered into that temporarily ageless state a man enters after he has just reached his prime; and he knew also that there were wrinkles engraved upon his brow, to stay and to deepen.

"Old" Shar, too had changed, his features losing some of their delicacy as he came into his maturity. Though the wedge-shaped bony structure of his face would give him a withdrawn and poetic look for as long as he lived, participation in the plan had given his expression a kind of executive overlay, which at best gave it a masklike rigidity, and at worst coarsened it somehow.

Yet despite the bleeding away of the years, the spaceship was still only a hulk. It lay upon a platform built above the tumbled boulders of the sandbar which stretched out from one wall of the world. It was an immense hull of pegged wood, broken by regularly spaced gaps through which the raw beams of the skeleton could be seen.

Work upon it had progressed fairly rapidly at first, for it was not hard to visualize what kind of vehicle would be needed to crawl through empty space without losing its water. It had been recognized that the sheer size of the machine would enforce a long period of construction, perhaps two full seasons; but neither Shar nor Lavon had anticipated any serious snag.

For that matter, part of the vehicle's apparent incompleteness was an illusion. About a third of its fittings were to consist of living creatures, which could not be expected to install themselves in the vessel much before the actual takeoff.

Yet time and time again, work on the ship had had to be halted for long periods. Several times whole sections needed to be ripped out, as it became more and more evident that hardly a single normal, understandable concept could be applied to the problem of space travel.

The lack of the history plates, which the Para steadfastly refused to deliver up, was a double handicap. Immediately upon their loss, Shar had set himself to reproduce them from memory; but unlike the more religious of his people, he had never regarded them as holy writ, and hence had never set himself to memorizing them word by word. Even before the theft, he had accumulated a set of variant translations of passages presenting specific experimental problems, which were stored in his library, carved in wood. But most of these translations tended to contradict each other, and none of them related to spaceship construction, upon which the original had been vague in any case.

No duplicates of the cryptic characters of the original had ever been made, for the simple reason that there was nothing in the sunken universe capable of destroying the originals, nor of duplicating their apparently changeless permanence. Shar remarked too late that through simple caution they should have made a number of verbatim temporary records—but after generations of green-gold peace, simple caution no longer covers preparation against catastrophe. (Nor, for that matter, did a culture which had to dig each letter of its simple alphabet into pulpy waterlogged wood with a flake of stonewort, encourage the keeping of records in triplicate.)

As a result, Shar's imperfect memory of the contents of the history plates, plus the constant and millennial doubt as to the accuracy of the

various translations, proved finally to be the worst obstacle to progress on the spaceship itself.

"Men must paddle before they can swim," Lavon observed belatedly, and Shar was forced to agree with him.

Obviously, whatever the ancients had known about spaceship construction, very little of that knowledge was usable to a people still trying to build its first spaceship from scratch. In retrospect, it was not surprising that the great hulk still rested incomplete upon its platform above the sand boulders, exuding a musty odor of wood steadily losing its strength, two generations after its flat bottom had been laid down.

The fat-faced young man who headed the strike delegation was Phil XX, a man two generations younger than Lavon, four younger than Shar. There were crow's-feet at the corners of his eyes, which made him look both like a querulous old man and like an infant spoiled in the spore.

"We're calling a halt to this crazy project," he said bluntly. "We've slaved our youth away on it, but now that we're our own masters, it's over, that's all. Over."

"Nobody's compelled you," Lavon said angrily.

"Society does; our parents do," a gaunt member of the delegation said. "But now we're going to start living in the real world. Everybody these days knows that there's no other world but this one. You oldsters can hang on to your superstitions if you like. We don't intend to."

Baffled, Lavon looked over at Shar. The scientist smiled and said, "Let them go, Lavon. We have no use for the faint-hearted."

The fat-faced young man flushed. "You can't insult us into going back to work. We're through. Build your own ship to no place!"

"All right," Lavon said evenly. "Go on, beat it. Don't stand around here orating about it. You've made your decision and we're not interested in your self-justifications. Good-by."

The fat-faced young man evidently still had quite a bit of heroism to dramatize which Lavon's dismissal had short-circuited. An examination of Lavon's stony face, however, convinced him that he had to take his victory as he found it. He and the delegation trailed ingloriously out the archway.

"Now what?" Lavon asked when they had gone. "I must admit, Shar, that I would have tried to persuade them. We do need the workers, after all."

"Not as much as they need us," Shar said tranquilly. "How many volunteers have you got for the crew of the ship?"

"Hundreds. Every young man of the generation after Phil's wants to

go along. Phil's wrong about that segment of the population, at least. The project catches the imagination of the very young."

"Did you give them any encouragement?"

"Sure," Lavon said. "I told them we'd call on them if they were chosen. But you can't take that seriously! We'd do badly to displace our picked group of specialists with youths who have enthusiasm and nothing else."

"That's not what I had in mind, Lavon. Didn't I see a Noc in your chambers somewhere? Oh, there he is, asleep in the dome. Noci!" The creature stirred its tentacles lazily.

"Noc, I've a message," Shar called. "The protos are to tell all men that those who wish to go to the next world with the spaceship must come to the staging area right away. Say that we can't promise to take everyone, but that only those who help us build the ship will be considered at all."

The Noc curled its tentacles again and appeared to go back to sleep. Actually, of course, it was sending its message through the water in all directions.

## IV

Lavon turned from the arrangement of speaking-tube megaphones which was his control board and looked at the Para. "One last try," he said. "Will you give us back the plates?"

"No, Lavon. We have never denied you anything before, but this we must."

"You're going with us though, Para. Unless you give us the knowledge we need, you'll lose your life if we lose ours."

"What is one Para?" the creature said. "We are all alike. This cell will die; but the protos need to know how you fare on this journey. We believe you should make it without the plates."

"Why?"

The proto was silent. Lavon stared at it a moment, then turned deliberately back to the speaking tubes. "Everyone hang on," he said. He felt shaky. "We're about to start. Tol, is the ship sealed?"

"As far as I can tell, Lavon."

Lavon shifted to another megaphone. He took a deep breath. Already the water seemed stifling, though the ship hadn't moved.

"Ready with one-quarter power. One, two, three, go."

The whole ship jerked and settled back into place again. The raphe diatoms along the under hull settled into their niches, their jelly treads turning against broad endless belts of crude leather. Wooden gears

creaked, stepping up the slow power of the creatures, transmitting it to the sixteen axles of the ship's wheels.

The ship rocked and began to roll slowly along the sandbar. Lavon looked tensely through the mica port. The world flowed painfully past him. The ship canted and began to climb the slope. Behind him, he could feel the electric silence of Shar, Para, the two alternate pilots, as if their gaze were stabbing directly through his body and on out the port. The world looked different, now that he was leaving it. How had he missed all this beauty before?

The slapping of the endless belts and the squeaking and groaning of the gears and axles grew louder as the slope steepened. The ship continued to climb, lurching. Around it, squadrons of men and protos dipped and wheeled, escorting it toward the sky.

Gradually the sky lowered and pressed down toward the top of the ship.

"A little more work from your diatoms, Tanol," Lavon said. "Boulder ahead." The ship swung ponderously. "All right, slow them up again. Give us a shove from your side, Than—no, that's too much—there, that's it. Back to normal; you're still turning us! Tanol, give us one burst to line us up again. Good. All right, steady drive on all sides. Won't be long now."

"How can you think in webs like that?" the Para wondered behind him.

"I just do, that's all. It's the way men think. Overseers, a little more thrust now; the grade's getting steeper."

The gears groaned. The ship nosed up. The sky brightened in Lavon's face. Despite himself, he began to be frightened. His lungs seemed to burn, and in his mind he felt his long fall through nothingness toward the chill slap of water as if he were experiencing it for the first time. His skin itched and burned. Could he go up *there* again? Up there into the burning void, the great gasping agony where no life should go?

The sandbar began to level out and the going became a little easier. Up here, the sky was so close that the lumbering motion of the huge ship disturbed it. Shadows of wavelets ran across the sand. Silently, the thick-barreled bands of blue-green algae drank in the light and converted it to oxygen, writhing in their slow mindless dance just under the long mica skylight which ran along the spine of the ship. In the hold, beneath the latticed corridor and cabin floors, whirling Vortae kept the ship's water in motion, fueling themselves upon drifting organic particles.

One by one, the figures wheeling about the ship outside waved arms or cilia and fell back, coasting down the slope of the sandbar toward

the familiar world, dwindling and disappearing. There was at last only one single Euglena, half-plant cousin of the protos, forging along beside the spaceship into the marches of the shallows. It loved the light, but finally it, too, was driven away into cooler, deeper waters, its single whiplike tentacle undulating placidly as it went. It was not very bright, but Lavon felt deserted when it left.

Where they were going, though, none could follow.

Now the sky was nothing but a thin, resistant skin of water coating the top of the ship. The vessel slowed, and when Lavon called for more power, it began to dig itself in among the sandgrains.

"That's not going to work," Shar said tensely. "I think we'd better step down the gear ratio, Lavon, so you can apply stress more slowly."

"All right," Lavon agreed. "Full stop, everybody. Shar, will you supervise gear-changing, please?"

Insane brilliance of empty space looked Lavon full in the face just beyond his big mica bull's eye. It was maddening to be forced to stop here upon the threshold of infinity; and it was dangerous, too. Lavon could feel building in him the old fear of the outside. A few moments more of inaction, he knew with a gathering coldness at the pit of his stomach, and he would be unable to go through with it.

Surely, he thought, there must be a better way to change gear-ratios than the traditional one, which involved dismantling almost the entire gear-box. Why couldn't a number of gears of different sizes be carried on the same shaft, not necessarily all in action all at once, but awaiting use simply by shoving the axle back and forth longitudinally in its sockets? It would still be clumsy, but it could be worked on orders from the bridge and would not involve shutting down the entire machine—and throwing the new pilot into a blue-green funk.

Shar came lunging up through the trap and swam himself a stop.

"All set," he said. "The big reduction gears aren't taking the strain too well, though."

"Splintering?"

"Yes. I'd go it slow at first."

Lavon nodded mutely. Without allowing himself to stop, even for a moment, to consider the consequences of his words, he called: "Half power."

The ship hunched itself down again and began to move, very slowly indeed, but more smoothly than before. Overhead, the sky thinned to complete transparency. The great light came blasting in. Behind Lavon there was an uneasy stir. The whiteness grew at the front ports.

Again the ship slowed, straining against the blinding barrier. Lavon



swallowed and called for more power. The ship groaned like something about to die. It was now almost at a standstill.

"More power," Lavon ground out.

Once more, with infinite slowness, the ship began to move. Gently, it tilted upward.

Then it lunged forward and every board and beam in it began to squall.

"Lavon! Lavon!"

Lavon started sharply at the shout. The voice was coming at him from one of the megaphones, the one marked for the port at the rear of the ship.

"Lavon!"

"What is it? Stop your damn yelling."

"I can see the top of the sky! From the *other* side, from the top side! It's like a big flat sheet of metal. We're going away from it. We're above the sky, Lavon, we're above the sky!"

Another violent start swung Lavon around toward the forward port. On the outside of the mica, the water was evaporating with shocking swiftness, taking with it strange distortions and patterns made of rainbows.

Lavon saw Space.

It was at first like a deserted and cruelly dry version of the bottom. There were enormous boulders, great cliffs, tumbled, split, riven, jagged rocks going up and away in all directions.

But it had a sky of its own—a deep blue dome so far away that he could not believe in, let alone compute, what its distance might be. And in this dome was a ball of white fire that seared his eyeballs.

The wilderness of rock was still a long way away from the ship, which now seemed to be resting upon a level, glistening plain. Beneath the surface-shine, the plain seemed to be made of sand, nothing but familiar sand, the same substance which had heaped up to form a bar in Lavon's own universe, the bar along which the ship had climbed. But the glassy, colourful skin over it—

Suddenly Lavon became conscious of another shout from the megaphone banks. He shook his head savagely and asked, "What is it now?"

"Lavon, this is Than. What have you gotten us into? The belts are locked. The diatoms can't move them. They aren't faking, either; we've rapped them hard enough to make them think we were trying to break their shells, but they still can't give us more power."

"Leave them alone," Lavon snapped. "They can't fake; they haven't

enough intelligence. If they say they can't give you more power, they can't."

"Well, then, you get us out of it," Than's voice said frightenedly.

Shar came forward to Lavon's elbow. "We're on a space-water interface, where the surface tension is very high," he said softly. "This is why I insisted on our building the ship so that we could lift the wheels off the ground whenever necessary. For a long while I couldn't understand the reference of the history plates to 'retractable landing gear,' but it finally occurred to me that the tension along a space-water interface—or, to be more exact, a space-mud interface—would hold any large object pretty tightly. If you order the wheels pulled up now, I think we'll make better progress for a while on the belly-treads."

"Good enough," Lavon said. "Hello below—up landing gear. Evidently the ancients knew their business after all, Shar."

Quite a few minutes later, for shifting power to the belly-treads involved another setting of the gear box, the ship was crawling along the shore toward the tumbled rock. Anxiously, Lavon scanned the jagged, threatening wall for a break. There was a sort of rivulet off toward the left which might offer a route, though a dubious one, to the next world. After some thought, Lavon ordered his ship turned toward it.

"Do you suppose that thing in the sky is a 'star'?" he asked. "But there were supposed to be lots of them. Only one is up there—and one's plenty for *my* taste."

"I don't know," Shar admitted. "But I'm beginning to get a picture of the way the universe is made, I think. Evidently our world is a sort of cup in the bottom of this huge one. This one has a sky of its own; perhaps it, too, is only a cup in the bottom of a still huger world, and so on and on without end. It's a hard concept to grasp, I'll admit. Maybe it would be more sensible to assume that all the worlds are cups in this one common surface, and that the great light shines on them all impartially."

"Then what makes it seem to go out every night, and dim even in the day during winter?" Lavon demanded.

"Perhaps it travels in circles, over first one world, then another. How could I know yet?"

"Well, if you're right, it means that all we have to do is crawl along here for a while, until we hit the top of the sky of another world," Lavon said. "Then we dive in. Somehow it seems too simple, after all our preparations."

Shar chuckled, but the sound did not suggest that he had discovered anything funny. "Simple? Have you noticed the temperature yet?"

Lavon had noticed it, just beneath the surface of awareness, but at Shar's remark he realized that he was gradually being stifled. The oxygen content of the water, luckily, had not dropped, but the temperature suggested the shallows in the last and worst part of the autumn. It was like trying to breathe soup.

"Than, give us more action from the Vortae," Lavon called. "This is going to be unbearable unless we get more circulation."  
It was all he could do now to keep his attention on the business of steering the ship.

The cut or defile in the scattered razor-edged rocks was a little closer, but there still seemed to be many miles of rough desert to cross. After a while, the ship settled into a steady, painfully slow crawling, with less pitching and jerking than before, but also with less progress. Under it, there was now a sliding, grinding sound, rasping against the hull of the ship itself, as if it were treadmilling over some coarse lubricant whose particles were each as big as a man's head.

Finally Shar said, "Lavon, we'll have to stop again. The sand this far up is dry, and we're wasting energy using the treads."

"Are you sure we can take it?" Lavon asked, gasping for breath.  
"At least we are moving. If we stop to lower the wheels and change gears again, we'll boil."

"We'll boil if we don't," Shar said calmly. "Some of our algae are already dead and the rest are withering. That's a pretty good sign that we can't take much more. I don't think we'll make it into the shadows, unless we do change over and put on some speed."

There was a gulping sound from one of the mechanics. "We ought to turn back," he said raggedly. "We were never meant to be out here in the first place. We were made for the water, not this hell."

"We'll stop," Lavon said, "but we're not turning back. That's final." The words made a brave sound, but the man had upset Lavon more than he dared to admit, even to himself. "Shar," he said, "make it fast, will you?"

The scientist nodded and dived below.

The minutes stretched out. The great white globe in the sky blazed and blazed. It had moved down the sky, far down, so that the light was pouring into the ship directly in Lavon's face, illuminating every floating particle, its rays like long milky streamers. The currents of water passing Lavon's cheek were almost hot.

How could they dare go directly forward into that inferno? The land directly under the "star" must be even hotter than it was here!  
"Lavon! Look at Para!"

Lavon forced himself to turn and look at his proto ally. The great slipper had settled to the deck, where it was lying with only a feeble pulsation of its cilia. Inside, its vacuoles were beginning to swell, to become bloated, pear-shaped bubbles, crowding the granulated protoplasm, pressing upon the dark nuclei.

"This cell is dying," Para said, as coldly as always. "But go on—go on. There is much to learn, and you may live, even though we do not. Go on."

"You're . . . for us now?" Lavon whispered.

"We have always been for you. Push your folly to its uttermost. We will benefit in the end, and so will Man."

The whisper died away. Lavon called the creature again, but it did not respond.

There was a wooden clashing from below, and then Shar's voice came tinnily from one of the megaphones. "Lavon, go ahead! The diatoms are dying, too, and then we'll be without power. Make it as quickly and directly as you can."

Grimly, Lavon leaned forward. "The 'star' is directly over the land we're approaching."

"It is? It may go lower still and the shadows will get longer. That's our only hope."

Lavon had not thought of that. He rasped into the banked megaphones. Once more, the ship began to move.  
It got hotter.

Steadily, with a perceptible motion, the "star" sank in Lavon's face. Suddenly a new terror struck him. Suppose it should continue to go down until it was gone entirely? Blasting though it was now, it was the only source of heat. Would not space become bitter cold on the instant—and the ship an expanding, bursting block of ice?

The shadows lengthened menacingly, stretched across the desert toward the forward-rolling vessel. There was no talking in the cabin, just the sound of ragged breathing and the creaking of the machinery.

Then the jagged horizon seemed to rush upon them. Stony teeth cut into the lower rim of the ball of fire, devoured it swiftly. It was gone.

They were in the lee of the cliffs. Lavon ordered the ship turned to parallel the rock-line; it responded heavily, sluggishly. Far above, the sky deepened steadily from blue to indigo.

Shar came silently up through the trap and stood beside Lavon, studying that deepening color and the lengthening of the shadows down the beach toward their world. He said nothing, but Lavon knew that the same chilling thought was in his mind.

"Lavon."

Lavon jumped. Shar's voice had iron in it. "Yes?"  
 "We'll have to keep moving. We must make the next world, wherever it is, very shortly."

"How can we dare move when we can't see where we're going? Why not sleep it over—if the cold will let us?"

"It will let us," Shar said. "It can't get dangerously cold up here. If it did, the sky—or what we used to think of as the sky—would have frozen over every night, even in summer. But what I'm thinking about is the water. The plants will go to sleep now. In our world that wouldn't matter; the supply of oxygen is enough to last through the night. But in this confined space, with so many creatures in it and no source of fresh water, we will probably smother."

Shar seemed hardly to be involved at all, but spoke rather with the voice of implacable physical laws.

"Furthermore," he said, staring unseeingly out at the raw landscape, "the diatoms are plants, too. In other words, we must stay on the move for as long as we have oxygen and power—and pray that we make it."

"Shar, we had quite a few protos on board this ship once. And Para there isn't quite dead yet. If he were, the cabin would be intolerable. The ship is nearly sterile of bacteria, because all the protos have been eating them as a matter of course and there's no outside supply of them, any more than there is for oxygen. But still and all there would have been some decay."

Shar bent and tested the pellicle of the motionless Para with a probing finger. "You're right, he's still alive. What does that prove?"

"The Vortae are also alive; I can feel the water circulating. Which proves it wasn't the heat that hurt Para. *It was the light*. Remember how badly my skin was affected after I climbed beyond the sky? Undiluted starlight is deadly. We should add that to the information on the plates."

"I still don't see the point."

"It's this. We've got three or four Noc down below. They were shielded from the light, and so must be alive. If we concentrate them in the diatom galleys, the dumb diatoms will think it's still daylight and will go on working. Or we can concentrate them up along the spine of the ship, and keep the algae putting out oxygen. So the question is: which do we need more, oxygen or power? Or can we split the difference?"

Shar actually grinned. "A brilliant piece of thinking. We'll make a Shar of you yet, Lavon. No, I'd say that we can't split the difference. There's something about daylight, some quality, that the light Noc emits doesn't have. You and I can't detect it, but the green plants can, and

without it they don't make oxygen. So we'll have to settle for the diatoms—for power."

Lavon brought the vessel away from the rocky lee of the cliff, out onto the smoother sand. All trace of direct light was gone now, although there was still a soft, general glow on the sky.

"Now, then," Shar said thoughtfully, "I would guess that there's water over there in the canyon, if we can reach it. I'll go below and arrange—"

Lavon gasped, "What's the matter?"

Silently, Lavon pointed, his heart pounding.

The entire dome of indigo above them was spangled with tiny, incredibly brilliant lights. There were hundreds of them, and more and more were becoming visible as the darkness deepened. And far away, over the ultimate edge of the rocks, was a dim red globe, crescented with ghostly silver. Near the zenith was another such body, much smaller, and silvered all over . . .

Under the two moons of Hydrot, and under the eternal stars, the two-inch wooden spaceship and its microscopic cargo toiled down the slope toward the drying little rivulet.

## V

The ship rested on the bottom of the canyon for the rest of the night. The great square doors were thrown open to admit the raw, irradiated, life-giving water from outside—and the wriggling bacteria which were fresh food.

No other creatures approached them, either with curiosity or with predatory intent, while they slept, though Lavon had posted guards at the doors. Evidently, even up here on the very floor of space, highly organized creatures were quiescent at night.

But when the first flush of light filtered through the water, trouble threatened.

First of all, there was the bug-eyed monster. The thing was green and had two snapping claws, either one of which could have broken the ship in two like a spyrogyra straw. Its eyes were black and globular, on the ends of short columns, and its long feelers were as thick as a plant-bolus. It passed in a kicking fury of motion, however, never noticing the ship at all.

"Is that—a sample of the kind of life we can expect in the next world?" Lavon whispered. Nobody answered, for the very good reason that nobody knew.

After a while, Lavon risked moving the ship forward against the cur-

rent, which was slow but heavy. Enormous writhing worms whipped past them. One struck the hull a heavy blow, then thrashed on obliviously.

"They don't notice us," Shar said. "We're too small. Lavon, the ancients warned us of the immensity of space, but even when you see it, it's impossible to grasp. And all those stars—can they mean what I think they mean? It's beyond thought, beyond belief!"

"The bottom's sloping," Lavon said, looking ahead intently. "The walls of the canyon are retreating, and the water's becoming rather silty. Let the stars wait, Shar; we're coming toward the entrance of our new world."

Shar subsided moodily. His vision of space had disturbed him, perhaps seriously. He took little notice of the great thing that was happening, but instead huddled worriedly over his own expanding speculations. Lavon felt the old gap between their two minds widening once more.

Now the bottom was tilting upward again. Lavon had no experience with delta-formation, for no rivulets left his own world, and the phenomenon worried him. But his worries were swept away in wonder as the ship topped the rise and nosed over.

Ahead, the bottom sloped away again, indefinitely, into glimmering depths. A proper sky was over them once more, and Lavon could see small rafts of plankton floating placidly beneath it. Almost at once, too, he saw several of the smaller kinds of protos, a few of which were already approaching the ship—

Then the girl came darting out of the depths, her features distorted with terror. At first she did not see the ship at all. She came twisting and turning lithely through the water, obviously hoping only to throw herself over the ridge of the delta and into the savage streamlet beyond. Lavon was stunned. Not that there were men here—he had hoped for that—but at the girl's single-minded flight toward suicide.

"What—"

Then a dim buzzing began to grow in his ears, and he understood.

"Shar! Than! Tanol!" he bawled. "Break out crossbows and spears! Knock out all the windows!" He lifted a foot and kicked through the big port in front of him. Someone thrust a crossbow into his hand.

"Eh? What's happening?" Shar blurted.

"Rotifers!"

The cry went through the ship like a galvanic shock. The rotifers back in Lavon's own world were virtually extinct, but everyone knew thoroughly the grim history of the long battle man and proto had waged against them.

The girl spotted the ship suddenly and paused, stricken by despair at the sight of the new monster. She drifted with her own momentum, her eyes alternately fixed hypnotically upon the ship and glancing back over her shoulder, toward where the buzzing snarled louder and louder in the dimness.

"Don't stop!" Lavon shouted. "This way, this way! We're friends! We'll help!"

Three great semi-transparent trumpets of smooth flesh bored over the rise, the many thick cilia of their coronas whirring greedily. Dicrans—the most predacious of the entire tribe of Eaters. They were quarreling thickly among themselves as they moved, with the few blurred, presymbolic noises which made up their "language."

Carefully, Lavon wound the crossbow, brought it to his shoulder, and fired. The bolt sang away through the water. It lost momentum rapidly, and was caught by a stray current which brought it closer to the girl than to the Eater at which Lavon had aimed.

He bit his lip, lowered the weapon, wound it up again. It did not pay to underestimate the range; he would have to wait until he could fire with effect. Another bolt, cutting through the water from a side port, made him issue orders to cease firing.

The sudden irruption of the rotifers decided the girl. The motionless wooden monster was strange to her and had not yet menaced her—but she must have known what it would be like to have three Dicrans over her, each trying to grab away from the other the biggest share. She threw herself toward the big port. The Eaters screamed with fury and greed and bored after her.

She probably would not have made it, had not the dull vision of the lead Dicran made out the wooden shape of the ship at the last instant. It backed off, buzzing, and the other two sheered away to avoid colliding with it. After that they had another argument, though they could hardly have formulated what it was that they were fighting about. They were incapable of saying anything much more complicated than the equivalent of "Yaah," "Drop dead," and "You're another."

While they were still snarling at each other, Lavon pierced the nearest one all the way through with an arblast bolt. It disintegrated promptly—rotifers are delicately organized creatures despite their ferocity—and the remaining two were at once involved in a lethal battle over the remains.

"Than, take a party out and spear me those two Eaters while they're still fighting," Lavon ordered. "Don't forget to destroy their eggs, too. I can see that this world needs a little taming."

The girl shot through the port and brought up against the far wall of the cabin, flailing in terror. Lavon tried to approach her, but from somewhere she produced a flake of stonewort clipped to a nasty point. He sat down on the stool before his control board and waited while she took in the cabin, Lavon, Shar, the pilot, the senescent Para.

At last she said: "Are—you—the gods from beyond the sky?" "We're from beyond the sky, all right," Lavon said. "But we're not gods. We're human beings, like yourself. Are there many humans here?"

The girl seemed to assess the situation very rapidly, savage though she was. Lavon had the odd and impossible impression that he should recognize her. She tucked the knife back into her matted hair—ah, Lavon thought, that's a trick I may need to remember—and shook her head.

"We are few. The Eaters are everywhere. Soon they will have the last of us."

Her fatalism was so complete that she actually did not seem to care. "And you've never cooperated against them? Or asked the protos to help?"

"The protos?" She shrugged. "They are as helpless as we are against the Eaters. We have no weapons which kill at a distance, like yours. And it is too late now for such weapons to do any good. We are too few, the Eaters too many."

Lavon shook his head emphatically. "You've had one weapon that counts, all along. Against it, numbers mean nothing. We'll show you how we've used it. You may be able to use it even better than we did, once you've given it a try."

The girl shrugged again. "We have dreamed of such a weapon now and then, but never found it. I do not think that what you say is true. What is this weapon?"

"Brains," Lavon said. "Not just one brain, but brains. Working together. Cooperation."

"Lavon speaks the truth," a weak voice said from the deck.

The Para stirred feebly. The girl watched it with wide eyes. The sound of the Para using human speech seemed to impress her more than the ship or anything else it contained.

"The Eaters can be conquered," the thin, buzzing voice said. "The protos will help, as they helped in the world from which we came. They fought this flight through space, and deprived Man of his records; but Man made the trip without the records. The protos will never oppose men again. I have already spoken to the protos of this world and have

told them what Man can dream, Man can do, whether the protos wish it or not.

"Shar, your metal records are with you. They were hidden in the ship. My brothers will lead you to them.

"This organism dies now. It dies in confidence of knowledge, as an intelligent creature dies. Man has taught us this. There is nothing that knowledge . . . cannot do. With it, men . . . have crossed . . . have crossed space . . ."

The voice whispered away. The shining slipper did not change, but something about it was gone. Lavon looked at the girl; their eyes met. "We have crossed space," Lavon repeated softly.

Shar's voice came to him across a great distance. The young-old man was whispering: "But *have* we?"

"As far as I'm concerned, yes," said Lavon.



# CRUCIFIXUS ETIAM

WALTER M. MILLER JR.

Manue Nanti joined the project to make some dough. Five dollars an hour was good pay, even in AD 2134, and there was no way to spend it while on the job. Everything would be furnished: housing, chow, clothing, toiletries, medicine, cigarettes, even a daily ration of one hundred eighty proof beverage alcohol, locally distilled from fermented Martian mosses as fuel for the project's vehicles. He figured that if he avoided crap games, he could finish his five-year contract with fifty thousand dollars in the bank, return to Earth, and retire at the age of twenty-four. Manue wanted to travel, to see the far corners of the world, the strange cultures, the simple people, the small towns, deserts, mountains, jungles—for until he came to Mars, he had never been further than a hundred miles from Cerro de Pasco, his birthplace in Peru.

A great wistfulness came over him in the cold Martian night when the frost haze broke, revealing the black, gleam-stung sky, and the blue-green Earth-star of his birth. *El mundo de mi carne, de mi alma*, he thought—yet, he had seen so little of it that many of its places would be more alien to him than the homogeneously ugly vistas of Mars. These he longed to see: the volcanoes of the South Pacific, the monstrous mountains of Tibet, the concrete cyclops of New York, the radioactive craters of Russia, the artificial islands in the China Sea, the Black Forest, the Ganges, the Grand Canyon—but most of all, the works of human art: the pyramids, the Gothic cathedrals of Europe, *Noire Dame de Chartres*, Saint Peter's, the tile-work wonders of Anacapri. But the dream was still a long labour from realization.

Manue was a big youth, heavy-boned and built for labour, clever in a simple mechanical way, and with a wistful good humour that helped him take a lot of guff from whiskey-breathed foremen and sharp-eyed engineers who made ten dollars an hour and figured ways for making more, legitimately or otherwise.

He had been on Mars only a month, and it hurt. Each time he

swung the heavy pick into the red-brown sod, his face winced with pain. The plastic aerator valves, surgically stitched in his chest, pulled and twisted and seemed to tear with each lurch of his body. The mechanical oxygenator served as a lung, sucking blood through an artificially grafted network of veins and plastic tubing, frothing it with air from a chemical generator, and returning it to his circulatory system. Breathing was unnecessary, except to provide wind for talking, but Manue breathed in desperate gulps of the 4.0 psi Martian air; for he had seen the wasted, atrophied chests of the men who had served four or five years, and he knew that when they returned to Earth—if ever—they would still need the auxiliary oxygenator equipment.

'If you don't stop breathing,' the surgeon told him, 'you'll be all right. When you go to bed at night, turn the oxy down low—so low you feel like panting. There's a critical point that's just right for sleeping. If you get it too low, you'll wake up screaming, and you'll get claustrophobia. If you get it too high, your reflex mechanisms will go to pot and you won't breathe: your lungs'll dry up after a time. Watch it.'

Manue watched it carefully, although the oldsters laughed at him—in their dry wheezing chuckles. Some of them could scarcely speak more than two or three words at a shallow breath.

'Breathe deep, boy,' they told him. 'Enjoy it while you can. You'll forget how pretty soon. Unless you're an engineer.'

The engineers had it soft, he learned. They slept in a pressurized barrack where the air was 10 psi and twenty-five per cent oxygen, where they turned their oxies off and slept in peace. Even their oxies were self-regulating, controlling the output according to the carbon dioxide content of the input blood. But the Commission could afford no such luxuries for the labour gangs. The payload of a cargo rocket from Earth was only about two per cent of the ship's total mass, and nothing superfluous could be carried. The ships brought the bare essentials, basic industrial equipment, big reactors, generators, engines, heavy tools.

Small tools, building materials, foods, non-nuclear fuels—these things had to be made on Mars. There was an open pit mine in the belly of the Syrtis Major where a 'lake' of nearly pure iron-rust was scooped into a smelter, and processed into various grades of steel for building purposes, tools, and machinery. A quarry in the Flathead

Mountains dug up large quantities of cement rock, burned it, and crushed it to make concrete.

It was rumoured that Mars was even preparing to grow her own labour force. An old-timer told him that the Commission had brought five hundred married couples to a new underground city in the Mare Erythraeum, supposedly as personnel for a local commission headquarters, but according to the old-timer, they were to be paid a bonus of three thousand dollars for every child born on the red planet. But Manue knew that the old 'troffies' had a way of inventing such stories, and he reserved a certain amount of scepticism.

As for his own share in the Project, he knew—and needed to know—very little. The encampment was at the north end of the Mare Cimmerium, surrounded by the bleak brown and green landscape of rock and giant lichens, stretching towards sharply defined horizons except for one mountain range in the distance, and hung over by a blue sky so dark that the Earth-star occasionally became dimly visible during the dim daytime. The encampment consisted of a dozen double-walled stone huts, windowless, and roofed with flat slabs of rock covered over by a tarry resin boiled out of the cactus-like spineplants. The camp was ugly, lonely, and dominated by the gaunt skeleton of a drill rig set up in its midst.

Manue joined the excavating crew in the job of digging a yard-wide, six-foot deep foundation trench in a hundred yard square around the drill rig, which day and night was biting deeper through the crust of Mars in a dry cut that necessitated frequent stoppages for changing rotary bits. He learned that the geologists had predicted a subterranean pocket of tritium oxide ice at sixteen thousand feet, and that it was for this that they were drilling. The foundation he was helping to dig would be for a control station of some sort.

He worked too hard to be very curious. Mars was a nightmare, a grim, womanless, frigid, disinterestedly evil world. His digging partner was a sloe-eyed Tibetan nicknamed 'Gee' who spoke the Ommlingua clumsily at best. He followed two paces behind Manue with a shovel, scooping up the broken ground, and humming a monotonous chant in his own tongue. Manue seldom heard his own language, and missed it; one of the engineers, a haughty Chilean, spoke the modern Spanish, but not to such as Manue Nanti. Most of the other labourers used either Basic English or the Ommlingua. He spoke both, but longed to hear the tongue of his

people. Even when he tried to talk to Gee, the cultural gulf was so wide that satisfying communication was nearly impossible. Peruvian jokes were unfunny to Tibetan ears, although Gee bent double with gales of laughter when Manue nearly crushed his own foot with a clumsy stroke of the pick.

He found no close companions. His foreman was a narrow-eyed, orange-browed Low German named Vögeli, usually half-drunk, and intent upon keeping his lungpower by bellowing at his crew. A meaty, florid man, he stalked slowly along the lip of the excavation, pausing to stare coldly down at each pair of labourers who, if they dared to look up, caught a guttural tongue-lashing for the moment's pause. When he had words for a digger, he called a halt by kicking a small avalanche of dirt back into the trench about the man's feet.

Manue learned about Vögeli's disposition before the end of his first month. The aerator tubes had become nearly unbearable; the skin, in trying to grow fast to the plastic, was beginning to form a tight little neck where the tubes entered his flesh, and the skin stretched and burned and stung with each movement of his trunk. Suddenly he felt sick. He staggered dizzily against the side of the trench, dropped the pick, and swayed heavily, bracing himself against collapse. Shock and nausea rocked him, while Gee stared at him and giggled foolishly.

'Hoy!' Vögeli bellowed from across the pit. 'Get back on that pick! Hoy, there! Get with it—'

Manue moved dizzily to recover the tool, saw patches of black swimming before him, sank weakly back to pant in shallow gasps. The nagging sting of the valves was a portable hell that he carried with him always. He fought an impulse to jerk them out of his flesh; if a valve came loose, he would bleed to death in a few minutes.

Vögeli came stamping along the heap of fresh earth and lumbered up to stand over the sagging Manue in the trench. He glared down at him for a moment, then nudged the back of his neck with a heavy boot. 'Get to work!'

Manue looked up and moved his lips silently. His forehead glistened with moisture in the faint sun, although the temperature was far below freezing.

'Grab that pick and get started.'

'Can't,' Manue gasped. 'Hoses—hurt.'

Vögeli grumbled a curse and vaulted down into the trench beside him. 'Unzip that jacket,' he ordered.

Weakly, Manue fumbled to obey, but the foreman knocked his hand aside and jerked the zipper down. Roughly he unbuttoned the Peruvian's shirt, laying open the bare brown chest to the icy cold. 'No!—not the hoses, please!'

Vögeli took one of the thin tubes in his blunt fingers and leaned close to peer at the puffy, calloused nodule of irritated skin that formed around it where it entered the flesh. He touched the nodule lightly, causing the digger to whimper.

'No, please!'

'Stop snivelling!'

Vögeli laid his thumbs against the nodule and exerted a sudden pressure. There was a slight popping sound as the skin slid back a fraction of an inch along the tube. Manue yelped and closed his eyes.

'Shut up! I know what I'm doing.' He repeated the process with the other tube. Then he seized both tubes in his hands and wiggled them slightly in and out, as if to ensure a proper resetting of the skin. The digger cried weakly and slumped in a dead faint.

When he awoke, he was in bed in the barracks, and a medic was painting the sore spots with a bright yellow solution that chilled his skin.

'Woke up, huh?' the medic grunted cheerfully. 'How you feel?'

'Matoi!' he hissed.

'Stay in bed for the day, son. Keep your oxy up high. Make you feel better.'

The medic went away, but Vögeli lingered, smiling at him grimly from the doorway. 'Don't try goofing off tomorrow too.'

Manue hated the closed door with silent eyes, and listened intently until Vögeli's footsteps left the building. Then, following the medic's instructions, he turned his oxy to maximum, even though the faster flow of blood made the chest-valves ache. The sickness fled, to be replaced with a weary afterglow. Drowsiness came over him, and he slept.

Sleep was a dread black-robed phantom on Mars. Mars pressed the same incubus upon all newcomers to her soil: a nightmare of falling, falling, falling into bottomless space. It was the faint gravity,

they said, that caused it. The body felt buoyed up, and the subconscious mind recalled down-going elevators, and diving airplanes, and a fall from a high cliff. It suggested these things in dreams, or if the dreamer's oxy were set too low, it conjured up a nightmare of sinking slowly deeper and deeper in cold, black water that filled the victim's throat. Newcomers were segregated in a separate barracks so that their nightly screams would not disturb the old-timers who had finally adjusted to Martian conditions.

But now, for the first time since his arrival, Manue slept soundly, airily, and felt borne up by beams of bright light.

When he awoke again, he lay clammy in the horrifying knowledge that he had not been breathing! It was so comfortable not to breathe. His chest stopped hurting because of the stillness of his rib cage. He felt refreshed and alive. Peaceful sleep.

Suddenly he was breathing again in harsh gasps, and cursing himself for the lapse, and praying amid quiet tears as he visualized the wasted chest of a troffie.

'*Heh heh!*' wheezed an oldster who had come in to readjust the furnace in the rookie barracks. 'You'll get to be a Martian pretty soon, boy. I been here seven years. Look at *me*.'

Manue heard the gasping voice and shuddered; there was no need to look.

'You just as well not fight it. It'll get you. Give in, make it easy on yourself. Go crazy if you don't.'

'Stop it! Let me alone!'

'Sure. Just one thing. You wanta go home, you think. I went home. Came back. You will, too. They all do, 'cept engineers. Know why?'

'Shut up!' Manue pulled himself erect on the cot and hissed anger at the old-timer, who was neither old nor young, but only withered by Mars. His head suggested that he might be around thirty-five, but his body was weak and old.

The veteran grinned. 'Sorry,' he wheezed. 'I'll keep my mouth shut.' He hesitated, then extended his hand. 'I'm Sam Donnell, mech-repairs.'

Manue still glowered at him. Donnell shrugged and dropped his hand.

'Just trying to be friends,' he muttered and walked away.

The digger started to call after him but only closed his mouth

again, tightly. Friends? He needed friends, but not a troffie. He couldn't even bear to look at them, for fear he might be looking into the mirror of his own future.

Manue climbed out of his bunk and donned his fleeceskins. Night had fallen, and the temperature was already twenty below. A soft sift of icedust obscured the stars. He stared about in the darkness. The mess hall was closed, but a light burned in the canteen and another in the foremen's club, where the men were playing cards and drinking. He went to get his alcohol ration, gulped it mixed with a little water, and trudged back to the barracks alone.

The Tibetan was in bed, staring blankly at the ceiling. Manue sat down and gazed at his flat, empty face.

'Why did you come here, Gee?'  
'Come where?'

'To Mars.'

Gee grinned, revealing large black-streaked teeth. 'Make money. Good money on Mars.'

'Everybody make money, huh?'  
'Sure.'

'Where's the money come from?'

Gee rolled his face toward the Peruvian and frowned. 'You crazy? Money come from Earth, where all money comes from.'

'And what does Earth get back from Mars?'

Gee looked puzzled for a moment, then gathered anger because he found no answer. He grunted a monosyllable in his native tongue, then rolled over and went to sleep.

Manue was not normally given to worrying about such things, but now he found himself asking, 'What am I doing here?'—and then, 'What is *anybody* doing here?'

The Mars Project had started eighty or ninety years ago, and its end goal was to make Mars habitable for colonists without Earth support, without oxies and insulated suits and the various gadgets a man now had to use to keep himself alive on the fourth planet. But thus far, Earth had planted without reaping. The sky was a bottomless well into which Earth poured her tools, dollars, manpower, and engineering skill. And there appeared to be no hope for the near future.

Manue felt suddenly trapped. He could not return to Earth before

the end of his contract. He was trading five years of virtual enslavement for a sum of money which would buy a limited amount of freedom. But what if he lost his lungs, became a servant of the small aerator for the rest of his days? Worst of all: whose ends was he serving? The contractors were getting rich—on government contracts. Some of the engineers and foremen were getting rich—by various forms of embezzlement of government funds. But what were the people back on Earth getting for their money? Nothing.

He lay awake for a long time, thinking about it. Then he resolved to ask someone tomorrow, someone smarter than himself.

But he found the question brushed aside. He summoned enough nerve to ask Vogel, but the foreman told him harshly to keep working and quit wondering. He asked the structural engineer who supervised the building, but the man only laughed, and said: 'What do you care? You're making good money.'

They were running concrete now, laying the long strips of Martian steel in the bottom of the trench and dumping in great slobbering wheelbarrowfuls of grey-green mix. The drillers were continuing their tedious dry cut deep into the red world's crust. Twice a day they brought up a yard long cylindrical sample of the rock and gave it to a geologist who weighed it, roasted it, weighed it again, and tested a sample of the condensed steam—if any—for tritium content. Daily, he chalked up the results on a blackboard in front of the engineering hut, and the technical staff crowded around for a look. Manue always glanced at the figures, but failed to understand.

Life became an endless routine of pain, fear, hard work, anger. There were few diversions. Sometimes a crew of entertainers came out from the Mare Erythraeum, but the labour gang could not all crowd in the pressurized staff-barracks where the shows were presented, and when Manue managed to catch a glimpse of one of the girls walking across the clearing, she was bundled in fleeceskins and hooded by a parka.

Itinerant rabbis, clergymen, and priests of the world's major faiths came occasionally to the camp: Buddhist, Moslem, and the Christian sects. Padre Antonio Selmi made monthly visits to hear confessions and offer Mass. Most of the gang attended all services as a diversion from routine, as an escape from nostalgia. Somehow it

gave Manue a strange feeling in the pit of his stomach to see the Sacrifice of the Mass, two thousand years old, being offered in the same ritual under the strange dark sky of Mars—with a section of the new foundation serving as an altar upon which the priest set crucifix, candles, relic-stone, missal, chalice, paten, ciborium, cruets, et cetera. In filling the wine-cruet before the service, Manue saw him spill a little of the red-clear fluid upon the brown soil—wine, Earth-wine from sunny Sicilian vineyards, trampled from the grapes by the bare stamping feet of children. Wine, the rich red blood of Earth, soaking slowly into the crust of another planet.

Bowing low at the consecration, the unhappy Peruvian thought of the prayer a rabbi had sung the week before: 'Blessed be the Lord our God, King of the Universe, Who makest bread to spring forth out of the Earth.'

Earth chalice, Earth blood, Earth God, Earth worshippers—with plastic tubes in their chests and a great sickness in their hearts.

He went away saddened. There was no faith here. Faith needed familiar surroundings, the props of culture. Here there were only swinging picks and rumbling machinery and sloshing concrete and the clatter of tools and the wheezing of troffies. Why? For five dollars an hour and keep?

Manue, raised in a back-country society that was almost a folk-culture, felt deep thirst for a goal. His father had been a stonemason, and he had laboured lovingly to help build the new cathedral, to build houses and mansions and commercial buildings, and his blood was mingled in their mortar. He had built for the love of his community and the love of the people and their customs, and their gods. He knew his own ends, and the ends of those around him. But what sense was there in this endless scratching at the face of Mars? Did they think they could make it into a second Earth, with pine forests and lakes and snow-capped mountains and small country villages? Man was not that strong. No, if he were labouring for any cause at all, it was to build a world so unearthlike that he could not love it.

The foundation was finished. There was very little more to be done until the drillers struck pay. Manue sat around the camp and worked at breathing. It was becoming a conscious effort now, and if he stopped thinking about it for a few minutes, he found himself inspiring shallow, meaningless little sips of air that scarcely moved

his diaphragm. He kept the aerator as low as possible, to make himself breathe great gasps that hurt his chest, but it made him dizzy, and he had to increase the oxygenation lest he faint.

Sam Donnell, the troffie mech-repairman, caught him about to slump dizzily from his perch atop a heap of rocks, pushed him erect, and turned his oxy back to normal. It was late afternoon, and the drillers were about to change shifts. Manue sat shaking his head for a moment, then gazed at Donnell gratefully.

'That's dangerous, kid,' the troffie wheezed. 'Guys can go psycho doing that. Which you rather have: sick lungs or sick mind?'

'Neither.'

'I know, but—'

'I don't want to talk about it.'

Donnell stared at him with a faint smile. Then he shrugged and sat down on the rock heap to watch the drilling.

'Oughia be hitting the tritium ice in a couple of days,' he said pleasantly. 'Then we'll see a big blow.'

Manue moistened his lips nervously. The troffies always made him feel uneasy. He stared aside.

'Big blow?'

'Lotta pressure down there, they say. Something about the way Mars got formed. Dust cloud hypothesis.'

Manue shook his head. 'I don't understand.'

'I don't either. But I've heard them talk. Couple of billion years ago, Mars was supposed to be a moon of Jupiter. Picked up a lot of ice crystals over a rocky core. Then it broke loose and picked up a rocky crust—from another belt of the dust cloud. The pockets of tritium ice catch a few neutrons from uranium ore—down under. Some of the tritium goes into helium. Frees oxygen. Gases form pressure. Big blow.'

'What are they going to do with the ice?'

The troffie shrugged. 'The engineers might know.'

Manue snorted and spat. 'They know how to make money.'

'Heh! Sure, everybody's gettin' rich.'

The Peruvian stared at him speculatively for a moment.

'Señor Donnell, I—'

'Sam'll do.'

'I wonder if anybody knows why... well... why we're really here.'

Donnell glanced up to grin, then waggled his head. He fell



thoughtful for a moment, and leaned forward to write in the earth. When he finished, he read it aloud.

'A plough plus a horse plus land equals the necessities of life.' He glanced up at Manue. 'AD Fifteen Hundred.'

The Peruvian frowned his bewilderment. Donnell rubbed out what he had written and wrote again.

'A factory plus steam turbines plus raw materials equals necessities plus luxuries. AD Nineteen Hundred.'

He rubbed it out and repeated the scribbling. 'All those things plus nuclear power and computer controls equal a surplus of everything. AD Twenty-one Hundred'

'So?'

'So, it's either cut production or find an outlet. Mars is an outlet for surplus energies, manpower, money. Mars Project keeps money turning over, keeps everything turning over. Economist told me that. Said if the Project folded, surplus would pile up—big depression on Earth.'

The Peruvian shook his head and sighed. It didn't sound right somehow. It sounded like an explanation somebody figured out after the whole thing started. It wasn't the kind of goal he wanted.

Two days later, the drill hit ice, and the 'big blow' was only a fizzle. There was talk around the camp that the whole operation had been a waste of time. The hole spewed a frosty breath for several hours, and the drill crews crowded around to stick their faces in it and breathe great gulps of the helium oxygen mixture. But then the blow subsided, and the hole leaked only a wisp of steam.

Technicians came, and lowered sonar 'cameras' down to the ice. They spent a week taking internal soundings and plotting the extent of the ice-dome on their charts. They brought up samples of ice and tested them. The engineers worked late into the Martian nights.

Then it was finished. The engineers came out of their huddles and called to the foremen of the labour gangs. They led the foremen around the site, pointing here, pointing there, sketching with chalk on the foundation, explaining in solemn voices. Soon the foremen were bellowing at their crews.

'Let's get the derrick down!'

'Start that mixer going!'

'Get that steel over here!'

'Unroll that dip-wire!'

'Get a move on! Shovel that fill!'

Muscles tightened and strained, machinery clamoured and rang. Voices grumbled and shouted. The operation was starting again. Without knowing why, Manue shovelled fill and stretched dip-wire and poured concrete for a big floor slab to be run across the entire hundred-yard square, broken only by the big pipe-casing that stuck up out of the ground in the centre and leaked a thin trail of steam.

The drill crew moved their rig half a mile across the plain to a point specified by the geologists and began sinking another hole. A groan went up from the structural boys: 'Not *another* one of these things!'

But the supervisory staff said, 'No, don't worry about it.'

There was much speculation about the purpose of the whole operation, and the men resented the quiet secrecy connected with the project. There could be no excuse for secrecy, they felt, in time of peace. There was a certain arbitrariness about it, a hint that the Commission thought of its employees as children, or enemies, or servants. But the supervisory staff shrugged off all questions with: 'You know there's tritium ice down there. You know it's what we've been looking for. Why? Well—what's the difference? There are lots of uses for it. Maybe we'll use it for one thing, maybe for something else. Who knows?'

Such a reply might have been satisfactory for an iron mine or an oil well or a stone quarry, but tritium suggested hydrogen-fusion. And no transportation facilities were being installed to haul the stuff away—no pipelines nor railroad tracks nor glider ports.

Manue quit thinking about it. Slowly he came to adopt a grim cynicism towards the tediousness, the back-breaking labour of his daily work; he lived from day to day like an animal, dreaming only of a return to Earth when his contract was up. But the dream was painful because it was distant, as contrasted with the immediacies of Mars: the threat of atrophy, coupled with the discomforts of continued breathing, the nightmares, the barrenness of the landscape, the intense cold, the harshness of men's tempers, the hardship of labour, and the lack of a cause.

A warm, sunny Earth was still over four years distant, and tomorrow would be another back-breaking, throat-parching, heart-tormenting, chest-hurting day. Where was there even a little pleasure in it? It was so easy, at least, to leave the oxy turned up at

night, and get a pleasant restful sleep. Sleep was the only recourse from harshness, and fear robbed sleep of its quiet sensuality—unless a man just surrendered and quit worrying about his lungs.

Manue decided that it would be safe to give himself two completely restful nights a week.

Concrete was run over the great square and trowelled to a rough finish. A glider train from the Mare Erythraeum brought in several huge crates of machinery, cut-stone masonry for building a wall, a shipful of new personnel, and a real rarity: lumber, cut from the first Earth-trees to be grown on Mars.

A building began going up with the concrete square for foundation and floor. Structures could be flimsier on Mars; because of the light gravity, compression-stresses were smaller. Hence, the work progressed rapidly, and as the flat-roofed structure was completed, the technicians began uncrating new machinery and moving it into the building. Manue noticed that several of the units were computers. There was also a small steam-turbine generator driven by an atomic-fired boiler.

Months passed. The building grew into an integrated mass of power and control systems. Instead of using the well for pumping, the technicians were apparently going to lower something into it. A bomb-shaped cylinder was slung vertically over the hole. The men guided it into the mouth of the pipe casing, then let it down slowly from a massive cable. The cylinder's butt was a multicontact socket like the female receptacle for a hundred-pin electron tube. Hours passed while the cylinder slipped slowly down beneath the hide of Mars. When it was done, the men hauled out the cable and began lowering stiff sections of pre-wired conduit, fitted with a receptacle at one end and a male plug at the other, so that as the sections fell into place, a continuous bundle of control cables was built up from 'bomb' to surface.

Several weeks were spent in connecting circuits, setting up the computers, and making careful tests. The drillers had finished the second well hole, half a mile from the first, and Manue noticed that while the testing was going on, the engineers sometimes stood atop the building and stared anxiously towards the steel skeleton in the distance. Once while the tests were being conducted, the second hole began squirting a jet of steam high in the thin air, and a frantic voice bellowed from the roof top.

'Cut it! Shut it off! Sound the danger whistle!'

The jet of steam began to shriek a low-pitched whine across the Martian desert. It blended with the rising and falling *OOOAWWWVVV* of the danger siren. But gradually it subsided as the men in the control station shut down the machinery. All hands came up cursing from their hiding places, and the engineers stalked out to the new hole carrying Geiger counters. They came back wearing pleased grins.

The work was nearly finished. The men began crating up the excavating machinery and the drill rig and the tools. The control-building devices were entirely automatic, and the camp would be deserted when the station began operation. The men were disgruntled. They had spent a year of hard labour on what they had thought to be a tritium well, but now that it was done, there were no facilities for pumping the stuff or hauling it away. In fact, they had pumped various solutions *into* the ground through the second hole, and the control station shaft was fitted with pipes that led from lead-lined tanks down into the earth.

Manue had stopped trying to keep his oxy properly adjusted at night. Turned up to a comfortable level, it was like a drug, ensuring comfortable sleep—and like addict or alcoholic, he could no longer endure living without it. Sleep was too precious, his only comfort. Every morning he awoke with a still, motionless chest, felt frightening remorse, sat up gasping, choking, sucking at the thin air with whining rattling lungs that had been idle too long. Sometimes he coughed violently, and bled a little. And then for a night or two he would correctly adjust the oxy, only to wake up screaming and suffocating. He felt hope sliding grimly away.

He sought out Sam Donnell, explained the situation, and begged the troffe for helpful advice. But the mech-repairman neither helped nor consoled nor joked about it. He only bit his lip, muttered something non-committal, and found an excuse to hurry away. It was then that Manue knew his hope was gone. Tissue was withering, tubercules forming, tubes growing closed. He knelt abjectly beside his cot, hung his face in his hands, and cursed softly, for there was no other way to pray an unanswerable prayer.

A glider train came in from the north to haul away the disassembled tools. The men lounged around the barracks or wandered across the Martian desert, gathering strange bits of rock and fossils, searching idly for a glint of metal or crystal in the wan

sunshine of early fall. The lichens were growing brown and yellow, and the landscape took on the hues of Earth's autumn if not the forms.

There was a sense of expectancy around the camp. It could be felt in the nervous laughter, and the easy voices, talking suddenly of Earth and old friends and the smell of food in a farm kitchen, and old half-forgotten tastes for which men hungered: ham searing in the skillet, a cup of frothing cider from a fermenting crock, iced melon with honey and a bit of lemon, onion gravy on homemade bread. But someone always remarked, 'What's the matter with-you guys? We ain't going home. Not by a long shot. We're going to another place just like this.'

And the group would break up and wander away, eyes tired, eyes haunted with nostalgia.

'What're we waiting for?' men shouted at the supervisory staff. 'Get some transportation in here. Let's get rolling.'

Men watched the skies for glider trains or jet transports, but the skies remained empty, and the staff remained close-mouthed. Then a dust column appeared on the horizon to the north, and a day later a convoy of tractor-trucks pulled into camp.

'Start loading aboard, men!' was the crisp command.

Surly voices: 'You mean we don't go by air? We gotta ride those kidney bouncers? It'll take a week to get to Mare Ery! Our contract says—'

'Load aboard! We're not going to Mare Ery yet!'

Grumbling, they loaded their baggage and their weary bodies into the trucks, and the trucks thundered and clattered across the desert, rolling towards the mountains.

The convoy rolled for three days towards the mountains, stopping at night to make camp, and driving on at sunrise. When they reached the first slopes of the foothills, the convoy stopped again. The deserted encampment lay a hundred and fifty miles behind. The going had been slow over the roadless desert.

'Everybody out!' barked the messenger from the lead truck. 'Bail out! Assemble at the foot of the hill.'

Voices were growling among themselves as the men moved in small groups from the trucks and collected in a milling tide in a shallow basin, overlooked by a low cliff and a hill. Manue saw the staff climb out of a cab and slowly work their way up the cliff. They carried a portable public address system.

'Gonna get a preaching,' somebody snarled.

'Sit down, please!' barked the loudspeaker. 'You men sit down there! Quiet—quiet, please!'

The gathering fell into a sulky silence. Will Kinley stood looking out over them, his eyes nervous, his hand holding the mike close to his mouth so that they could hear his weak troffie voice.

'If you men have questions,' he said, 'I'll answer them now. Do you want to know what you've been doing during the past year?'

An affirmative rumble arose from the group.

'You've been helping to give Mars a breathable atmosphere.' He glanced briefly at his watch, then looked back at his audience. 'In fifty minutes, a controlled chain reaction will start in the tritium ice. The computers will time it and try to control it. Helium, and oxygen will come blasting up out of the second hole.'

A rumble of disbelief arose from his audience. Someone shouted: 'How can you get air to blanket a planet from one hole?'

'You can't,' Kinley replied crisply. 'A dozen others are going in, just like that one. We plan three hundred, and we've already located the ice pockets. Three hundred wells, working for eight centuries, can get the job done.'

'Eight centuries! What good—'

'Wait!' Kinley barked. 'In the meantime, we'll build pressurized cities close to the wells. If everything pans out, we'll get a lot of colonists here, and gradually condition them to live in a seven or eight psi atmosphere—which is about the best we can hope to get. Colonists from the Andes and the Himalayas—they wouldn't need much conditioning.'

'What about us?'

There was a long plaintive silence. Kinley's eyes scanned the group sadly, and wandered towards the Martian horizon, gold and brown in the late afternoon.

'Nothing—about us,' he muttered quietly.

'Why did we come out here?'

'Because there's danger of the reaction getting out of hand. We can't tell anyone about it, or we'd start a panic.' He looked at the group sadly. 'I'm telling you now, because there's nothing you could do. In thirty minutes—'

There were angry murmurs in the crowd. 'You mean there may be an explosion?'

'There will be a limited explosion. And there's very little danger of anything more. The worst danger is in having ugly rumours start

in the cities. Some fool with a slip-stick would hear about it, and calculate what would happen to Mars if five cubic miles of tritium ice detonated in one split second. It would probably start a riot. That's why we've kept it a secret.'

The buzz of voices was like a disturbed beehive. Manue Nanti sat in the midst of it, saying nothing, wearing a dazed and weary face, thoughts jumbled, soul drained of feeling.

Why should men lose their lungs that after eight centuries of tomorrows, other men might breathe the air of Mars as the air of Earth?

Other men around him echoed his thoughts in jealous mutterings. They had been helping to make a world in which they would never live.

An enraged scream arose near where Manue sat. 'They're going to blow us up! They're going to blow up Mars.'

'Don't be a fool!' Kinley snapped.

'Fools they call us! We are fools! For ever coming here! We got sucked in! Look at me!' A pale, dark-haired man came wildly to his feet and tapped his chest. 'Look! I'm losing my lungs! We're all losing our lungs! Now they take a chance on killing everybody.'

'Including ourselves,' Kinley called coldly.

'We oughta take him apart. We oughta kill every one who knew about it—and Kinley's a good place to start!'

The rumble of voices rose higher, calling both agreement and dissent. Some of Kinley's staff were looking nervously towards the trucks. They were unarmed.

'You men sit down!' Kinley barked.

Rebellious eyes glared at the supervisor. Several men who had come to their feet dropped to their haunches again. Kinley glowered at the pale upriser who called for his scalp.

'Sit down, Handell!'

Handell turned his back on the supervisor and called out to the others. 'Don't be a bunch of cowards! Don't let him bully you!'

'You men sitting around Handell. Pull him down.'

There was no response. The men, including Manue, stared up at the wild-eyed Handell gloomily, but made no move to quiet him. A pair of burly foremen started through the gathering from its outskirts.

'Stop!' Kinley ordered. 'Turpin, Schultz—get back. Let the men handle this themselves.'

Half a dozen others had joined the rebellious Handell. They were speaking in low tense tones among themselves.

'For the last time, men! Sit down!'

The group turned and started grimly towards the cliff. Without reasoning why, Manue slid to his feet quietly as Handell came near him. 'Come on, fellow, let's get him,' the leader muttered.

The Peruvian's fist chopped a short stroke to Handell's jaw, and the dull *thuk* echoed across the clearing. The man crumpled, and Manue crouched over him like a hissing panther. 'Get back!' he snapped at the others. 'Or I'll jerk his hoses out.'

One of the others cursed him.

'Want to fight, fellow?' the Peruvian wheezed. 'I can jerk several hoses out before you drop me!'

They shuffled nervously for a moment.

'The guy's crazy!' one complained in a high voice.

'Get back or he'll kill Handell!'

They sidled away, moved aimlessly in the crowd, then sat down to escape attention. Manue sat beside the fallen man and gazed at the thinly smiling Kinley.

'Thank you, son. There's a fool in every crowd.' He looked at his watch again. 'Just a few minutes, men. Then you'll feel the Earth-tremor, and the explosion, and the wind. You can be proud of that wind, men. It's new air for Mars, and you made it.'

'But we can't breathe it!' hissed a troifle.

Kinley was silent for a long time, as if listening to the distance. 'What man ever made his own salvation?' he murmured.

They packed up the public address amplifier and came down the hill to sit in the cab of a truck waiting.

It came as an orange glow in the south, and the glow was quickly shrouded by an expanding white cloud. Then minutes later the ground pulsed beneath them, quivered and shook. The quake subsided, but remained as a hint of vibration. Then after a long time, they heard the dull-throated roar thundering across the Martian desert. The roar continued steadily, grumbling and growing as it would do for several hundred years.

There was only a hushed murmur of awed voices from the crowd. When the wind came, some of them stood up and moved quietly back to the trucks, for now they could go back to a city for



reassignment. There were other tasks to accomplish before their contracts were done.

But Manue Nanti still sat on the ground, his head sunk low, desperately trying to gasp a little of the wind he had made, the wind out of the ground, the wind of the future. But lungs were clogged, and he could not drink of the racing wind. His big calloused hand clutched slowly at the ground, and he choked a brief sound like a sob.

A shadow fell over him. It was Kinley, come to offer his thanks for the quelling of Handell. But he said nothing for a moment as he watched Manue's desperate Gethsemane.

'Some sow, others reap,' he said.

'Why?' the Peruvian choked.

The supervisor shrugged. 'What's the difference? But if you can't be both, which would you rather be?'

Nanti looked up into the wind. He imagined a city to the south, a city built on tear-soaked ground, filled with people who had no ends beyond their culture, no goal but within their own society. It was a good sensible question: Which would he rather be—sower or reaper?

Pride brought him slowly to his feet, and he eyed Kinley questioningly. The supervisor touched his shoulder.

'Go on to the trucks.'

Nanti nodded and shuffled away. He had wanted something to work for, hadn't he? Something more than the reasons Donnell had given. Well, he could smell a reason, even if he couldn't breathe it.

Eight hundred years was a long time, but then—long time, big reason. The air smelled good, even with its clouds of boiling dust.

He knew now what Mars was—not a ten-thousand-a-year job, not a garbage can for surplus production. But an eight-century passion of human faith in the destiny of the race of Man. He paused short of the truck. He had wanted to travel, to see the sights of Earth, the handiwork of Nature and of history, the glorious places of his planet.

He stooped, and scooped up a handful of the red-brown soil, letting it sift slowly between his fingers. Here was Mars—his planet now. No more of Earth, not for Manue Nanti. He adjusted his aerator more comfortably and climbed into the waiting truck.

## THE TUNNEL UNDER THE WORLD

FREDERIK POHL

On the morning of June 15th, Guy Burckhardt woke up screaming out of a dream.

It was more real than any dream he had ever had in his life. He could still hear and feel the sharp, ripping-metal explosion, the violent heave that had tossed him furiously out of bed, the searing wave of heat.

He sat up convulsively and stared, not believing what he saw, at the quiet room and the bright sunlight coming in the window. He croaked, 'Mary?'

His wife was not in the bed next to him. The covers were tumbled and awry, as though she had just left it, and the memory of the dream was so strong that instinctively he found himself searching the floor to see if the dream explosion had thrown her down.

But she wasn't there. Of course she wasn't, he told himself, looking at the familiar vanity and slipper chair, the unctacked window, the unbuckled wall. It had only been a dream.

'Guy?' His wife was calling him querulously from the foot of the stairs. 'Guy, dear, are you all right?'

He called weakly, 'Sure.'

There was a pause. Then Mary said doubtfully, 'Breakfast is ready. Are you sure you're all right? I thought I heard you yelling—'

Burckhardt said more confidently, 'I had a bad dream, honey. Be right down.'

In the shower, punching the lukewarm-and-cologne he favoured, he told himself that it had been a beaut of a dream. Still, bad dreams weren't unusual, especially bad dreams about explosions. In the past thirty years of H-bomb jitters, who had not dreamed of explosions?



# THE NINE BILLION NAMES OF GOD

by Arthur C. Clarke

"This is a slightly unusual request," said Dr. Wagner, with what he hoped was commendable restraint. "As far as I know, it's the first time anyone's been asked to supply a Tibetan monastery with an Automatic Sequence Computer. I don't wish to be inquisitive, but I should hardly have thought that your—ah—establishment had much use for such a machine. Could you explain just what you intend to do with it?"

"Gladly," replied the lama, readjusting his silk robes and carefully putting away the slide rule he had been using for currency conversions. "Your Mark V Computer can carry out any routine mathematical operation involving up to ten digits. However, for our work we are interested in *letters*, not numbers. As we wish you to modify the output circuits, the machine will be printing words, not columns of figures."

"I don't quite understand. . . ."

"This is a project on which we have been working for the last three centuries—since the lamasery was founded, in fact. It is somewhat alien to your way of thought, so I hope you will listen with an open mind while I explain it."

"Naturally."

"It is really quite simple. We have been compiling a list which shall contain all the possible names of God."

"I beg your pardon?"

"We have reason to believe," continued the lama imperturbably, "that all such names can be written with not more than nine letters in an alphabet we have devised."

"And you have been doing this for three centuries?"

*First published in 1953*

## THE NINE BILLION NAMES OF GOD

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"Yes: we expected it would take us about fifteen thousand years to complete the task."

"Oh," Dr. Wagner looked a little dazed. "Now I see why you wanted to hire one of our machines. But exactly what is the *purpose* of this project?"

The lama hesitated for a fraction of a second, and Wagner wondered if he had offended him. If so, there was no trace of annoyance in the reply.

"Call it ritual, if you like, but it's a fundamental part of our belief. All the many names of the Supreme Being—God, Jehovah, Allah, and so on—they are only man-made labels. There is a philosophical problem of some difficulty here, which I do not propose to discuss, but somewhere among all the possible combinations of letters that can occur are what one may call the *real* names of God. By systematic permutation of letters, we have been trying to list them all."

"I see. You've been starting at AAAAAA . . . and working up to ZZZZZZ. . . ."

"Exactly—though we use a special alphabet of our own. Modifying the electromagnetic typewriters to deal with this is, of course, trivial. A rather more interesting problem is that of devising suitable circuits to eliminate ridiculous combinations. For example, no letter must occur more than three times in succession."

"Three? Surely you mean two."

"Three is correct: I am afraid it would take too long to explain why, even if you understood our language."

"I'm sure it would," said Wagner hastily. "Go on."

"Luckily, it will be a simple matter to adapt your Automatic Sequence Computer for this work, since once it has been programmed properly it will permute each letter in turn and print the result. What would have taken us fifteen thousand years it will be able to do in a hundred days."

Dr. Wagner was scarcely conscious of the faint sounds from the Manhattan streets far below. He was in a different world, a world of natural, not man-made, mountains. High up in their remote aeries these monks had been patiently at work, generation after generation, compiling their lists of meaningless words. Was there any limit to the follies of mankind? Still, he must give no hint of his inner thoughts. The customer was always right. . . .

"There's no doubt," replied the doctor, "that we can modify the Mark V to print lists of this nature. I'm much more worried about the problem of installation and maintenance. Getting out to Tibet, in these days, is not going to be easy."

"We can arrange that. The components are small enough to travel by air—that is one reason why we chose your machine. If you can get them to India, we will provide transport from there."

"And you want to hire two of our engineers?"

"Yes, for the three months that the project should occupy."

"I've no doubt that Personnel can manage that." Dr. Wagner scribbled a note on his desk pad. "There are just two other points—"

Before he could finish the sentence the lama had produced a small slip of paper.

"This is my certified credit balance at the Asiatic Bank."

"Thank you. It appears to be—ah—adequate. The second matter is so trivial that I hesitate to mention it—but it's surprising how often the obvious gets overlooked. What source of electrical energy have you?"

"A diesel generator providing fifty kilowatts at a hundred and ten volts. It was installed about five years ago and is quite reliable. It's made life at the lamasery much more comfortable, but of course it was really installed to provide power for the motors driving the prayer wheels."

"Of course," echoed Dr. Wagner. "I should have thought of that."

\* \* \*

The view from the parapet was vertiginous, but in time one gets used to anything. After three months, George Hanley was not impressed by the two-thousand-foot swoop into the abyss or the remote checkerboard of fields in the valley below. He was leaning against the wind-smoothed stones and staring morosely at the distant mountains whose names he had never bothered to discover.

This, thought George, was the craziest thing that had ever happened to him. "Project Shangri-La," some wit back at the labs had christened it. For weeks now the Mark V had been churning out acres of sheets covered with gibberish. Patiently, inexorably, the computer had been rearranging letters in all their possible combinations, exhausting each class before going on to the next. As the sheets had emerged from the electromagnetic typewriters, the monks had carefully cut them up and pasted them into enormous books. In another week, heaven be praised, they would have finished. Just what obscure calculations had convinced the monks that they needn't bother to go on to words of ten, twenty, or a hundred letters, George didn't know. One of his recurring nightmares was that there would be some change of plan, and that the high lama (whom they'd naturally called Sam Jaffe, though he didn't look a bit like him) would suddenly announce that the project would be extended to approximately A.D. 2060. They were quite capable of it.

George heard the heavy wooden door slam in the wind as Chuck came out onto the parapet beside him. As usual, Chuck was smoking one of the cigars that made him so popular with the monks—who, it seemed, were quite willing to embrace all the minor and most of the major pleasures of life. That was one thing in their favor: they might be crazy, but they weren't bluenoses. Those frequent trips they took down to the village, for instance...

"Listen, George," said Chuck urgently. "I've learned something that means trouble."

"What's wrong? Isn't the machine behaving?" That was the worst contingency George could imagine. It might delay his return, and nothing could be more horrible. The way he felt now, even the sight of a TV commercial would seem like manna from heaven. At least it would be some link with home.

"No—it's nothing like that." Chuck settled himself on the parapet, which was unusual because normally he was scared of the drop. "I've just found what all this is about."

"What d'ya mean? I thought we knew."

"Sure—we know what the monks are trying to do. But we didn't know *why*. It's the craziest thing—"

"Tell me something new," growled George.

"—but old Sam's just come clean with me. You know the way he drops in every afternoon to watch the sheets roll out. Well, this time he seemed rather excited, or at least as near as he'll ever get to it. When I told him that we were on the last cycle he asked me, in that cute English accent of his, if I'd ever wondered what they were trying to do. I said, 'Sure'—and he told me."

"Go on: I'll buy it."

"Well, they believe that when they have listed all His names—and they reckon that there are about nine billion of them—God's purpose will be achieved. The human race will have finished what it was created to do, and there won't be any point in carrying on. Indeed, the very idea is something like blasphemy."

"Then what do they expect us to do? Commit suicide?"

"There's no need for that. When the list's completed, God steps in and simply winds things up... bingo!"

"Oh, I get it. When we finish our job, it will be the end of the world."

Chuck gave a nervous little laugh.

"That's just what I said to Sam. And do you know what happened? He looked at me in a very queer way, like I'd been stupid in class, and said, 'It's nothing as trivial as *that*.'"

George thought this over for a moment.

"That's what I call taking the Wide View," he said presently. "But what d'you suppose we should do about it? I don't see that it makes the slightest difference to us. After all, we already knew that they were crazy."

"Yes—but don't you see what may happen? When the list's complete and the Last Trump doesn't blow—or whatever it is they expect—we may get the blame. It's our machine they've been using. I don't like the situation one little bit."

"I see," said George slowly. "You've got a point there. But this sort of thing's happened before, you know. When I was a kid down in Louisiana we had a crackpot preacher who once said the world was going to end next Sunday. Hundreds of people believed him—even sold their homes. Yet when nothing happened, they didn't turn nasty, as you'd expect. They just decided that he'd made a mistake in his calculations and went right on believing. I guess some of them still do."

"Well, this isn't Louisiana, in case you hadn't noticed. There are just two of us and hundreds of these monks. I like them, and I'll be sorry for old Sam when his lifework backfires on him. But all the same, I wish I was somewhere else."

"I've been wishing that for weeks. But there's nothing we can do until the contract's finished and the transport arrives to fly us out."

"Of course," said Chuck thoughtfully, "we could always try a bit of sabotage."

"Like hell we could! That would make things worse."

"Not the way I meant. Look at it like this. The machine will finish its run four days from now, on the present twenty-hours-a-day basis. The transport calls in a week. O.K.—then all we need to do is to find something that needs replacing during one of the overhaul periods—something that will hold up the works for a couple of days. We'll fix it, of course, but not too quickly. If we time matters properly, we can be down at the airfield when the last name pops out of the register. They won't be able to catch us then."

"I don't like it," said George. "It will be the first time I ever walked out on a job. Besides, it would make them suspicious. No, I'll sit tight and take what comes."

"I still don't like it," he said, seven days later, as the tough little mountain ponies carried them down the winding road. "And don't you think I'm running away because I'm afraid. I'm just sorry for those poor old guys up there, and I don't want to be around when they find what suckers they've been. Wonder how Sam will take it?"

"It's funny," replied Chuck, "but when I said good-by I got the idea

he knew we were walking out on him—and that he didn't care because he knew the machine was running smoothly and that the job would soon be finished. After that—well, of course, for him there just isn't any After That. . . ."

George turned in his saddle and stared back up the mountain road. This was the last place from which one could get a clear view of the lamasery. The squat, angular buildings were silhouetted against the afterglow of the sunset: here and there, lights gleamed like portholes in the side of an ocean liner. Electric lights, of course, sharing the same circuit as the Mark V. How much longer would they share it? wondered George. Would the monks smash up the computer in their rage and disappointment? Or would they just sit down quietly and begin their calculations all over again?

He knew exactly what was happening up on the mountain at this very moment. The high lama and his assistants would be sitting in their silk robes, inspecting the sheets as the junior monks carried them away from the typewriters and pasted them into the great volumes. No one would be saying anything. The only sound would be the incessant patter, the never-ending rainstorm of the keys hitting the paper, for the Mark V itself was utterly silent as it flashed through its thousands of calculations a second. Three months of this, thought George, was enough to start anyone climbing up the wall.

"There she is!" called Chuck, pointing down into the valley. "Ain't she beautiful!"

She certainly was, thought George. The battered old DC3 lay at the end of the runway like a tiny silver cross. In two hours she would be bearing them away to freedom and sanity. It was a thought worth savoring like a fine liqueur. George let it roll round his mind as the pony trudged patiently down the slope.

The swift night of the high Himalayas was now almost upon them. Fortunately, the road was very good, as roads went in that region, and they were both carrying torches. There was not the slightest danger, only a certain discomfort from the bitter cold. The sky overhead was perfectly clear, and ablaze with the familiar, friendly stars. At least there would be no risk, thought George, of the pilot being unable to take off because of weather conditions. That had been his only remaining worry.

He began to sing, but gave it up after a while. This vast arena of mountains, gleaming like whitely hooded ghosts on every side, did not encourage such ebullience. Presently George glanced at his watch.

"Should be there in an hour," he called back over his shoulder to Chuck. Then he added, in an afterthought: "Wonder if the computer's finished its run. It was due about now."

*Arthur C. Clarke*

Chuck didn't reply, so George swung round in his saddle. He could just see Chuck's face, a white oval turned toward the sky.

"Look," whispered Chuck, and George lifted his eyes to heaven. (There is always a last time for everything.)

Overhead, without any fuss, the stars were going out.

## IT'S A GOOD LIFE

*by Jerome Bixby*

Aunt Amy was out on the front porch, rocking back and forth in the highbacked chair and fanning herself, when Bill Soames rode his bicycle up the road and stopped in front of the house.

Perspiring under the afternoon "sun," Bill lifted the box of groceries out of the big basket over the front wheel of the bike, and came up the front walk.

Little Anthony was sitting on the lawn, playing with a rat. He had caught the rat down in the basement—he had made it think that it smelled cheese, the most rich-smelling and crumbly-delicious cheese a rat had ever thought it smelled, and it had come out of its hole, and now Anthony had hold of it with his mind and was making it do tricks.

When the rat saw Bill Soames coming, it tried to run, but Anthony thought at it, and it turned a flip-flop on the grass, and lay trembling, its eyes gleaming in small black terror.

Bill Soames hurried past Anthony and reached the front steps, mumbling. He always mumbled when he came to the Fremont house, or passed by it, or even thought of it. Everybody did. They thought about silly things, things that didn't mean very much, like two-and-two-is-four-and-twice-is-eight and so on; they tried to jumble up their thoughts and keep them skipping back and forth, so Anthony couldn't read their minds. The mumbling helped. Because if Anthony got anything strong out of your thoughts, he might take a notion to do something about it—like curing your wife's sick headaches or your kid's mumps, or getting your old milk cow back on schedule, or fixing the privy. And while