


MOSAIC

MOSAIC



THE UNORTHODOX ENGINEERS: THE PEN AND THE DARK

Adventure game program by
KEITH CAMPBELL

Based on the story by
COLIN KAPP

Instructions
and the complete story

BOOKWARE

Contents

Using the program	
If you are using a BBC Micro B	3
If you are using a Commodore 64	5
If you are using a Spectrum (48K)	7

How to play the game	9
-----------------------------	---

The Pen and the Dark by Colin Kapp	11
---	----

Using the program

The program is recorded twice, once on each side of the cassette.

If you are using a BBC Micro B

LOADING

Takes approximately 6 minutes.

Insert the cassette in the cassette recorder and ensure it is fully rewound.

Type CHAIN"" and press RETURN.

Press the PLAY key on your cassette recorder.

The game is recorded as two programs: MOSAIC and THE PEN & THE DARK. The procedure will now vary, depending upon whether or not your cassette recorder has a motor control facility.

Cassette recorders with motor control: If your recorder has motor control, then leave the cassette in the recorder with the PLAY key depressed until the second program has loaded, and the game begins. It will start running automatically.

Cassette recorders without motor control: If your recorder does not have motor control, watch for a message to appear on the screen telling you to stop the cassette recorder. Stop the player immediately, but leave the cassette in place. After the first program has run and the message "SEARCHING" appears at the bottom of the screen, press the PLAY button on the recorder. The second program will now load and start running automatically.

Computers equipped with disk drive: Before loading type *TAPE and press RETURN. Then type PAGE = & E00 and press RETURN.

PLAYING THE GAME

Ensure that your computer is in the CAPS LOCK mode, so that your typed command is displayed in upper case. If the CAPS LOCK light is not on, press the CAPS LOCK key once.

Mosaic Publishing Ltd, 187 Upper Street, London N1 1RQ

Marketed by

John Wiley & Sons Limited, Baffins Lane, Chichester, Sussex PO19 1UD

Program © Keith Campbell 1984

The Pen and the Dark © Colin Kapp 1979

(The Unorthodox Engineers by Colin Kapp, published by Dobson Books, 1979, contains all five stories in the series).

No part of this software may be reproduced in any form or by any means by any persons or institutions without the prior written permission of the publishers, Mosaic Publishing Limited. This software is sold subject to the condition that it shall not, by way of trade or otherwise, be re-sold, lent or hired out without Mosaic Publishing Limited's prior written consent and, in the case of re-sale, without a similar condition being imposed on the subsequent purchaser.

Production services by Book Production Consultants, Cambridge

Printed by the Burlington Press (Cambridge) Ltd., Foxton, Cambridge.

TO SAVE A GAME POSITION

You may save your current game position so that you can turn the computer off, yet return later to the same stage in the game. To do this:

Insert a spare cassette in the recorder.

Type as a game command "SAVE GAME".

The computer will announce that it is saving the game and prompt you with "RECORD THEN RETURN".

Press the RECORD keys on the cassette recorder.

After allowing for the cassette leader tape to pass the record head of the cassette recorder, press RETURN.

When saving is complete (about 20 seconds) the tape will stop, and you will be returned to your current game (which you can continue playing) with the message "GAME SAVED".

TO LOAD A SAVED GAME

At the start, or at any time during playing a game, you may restore a previously saved game position in the following way:

Insert the rewound 'saved game' cassette in the cassette recorder.

Type "LOAD GAME" and press RETURN. The computer will announce that it is loading a game, and the word "SEARCHING" will appear on the screen.

Press PLAY on the recorder. The old position will be loaded, and you will automatically be returned to the game at the stage you were at when you saved it.



If you are using a Commodore 64

LOADING

Takes approximately 13 minutes.

Insert the cassette in the datasette and ensure that it is fully rewound.

Press the SHIFT and RUN/STOP keys together.

Press the PLAY key on the datasette.

The game is recorded as two programs, 'mosaic' and 'pen & dark'. Both will load and run automatically. The screen will go blank again after the title page has appeared, while the second program loads. When this has loaded you may start the game.

PLAYING THE GAME

The program accepts lower case letters only. Do not press the SHIFT, SHIFT LOCK or COMMODORE keys as the program will not be able to interpret your commands if they are in capitals or graphic characters.

TO SAVE A GAME POSITION

You may save your current game position so that you can turn the computer off, yet return later to the same stage in the game. To do this:

Insert a spare cassette in the datasette and ensure that the tape leader has passed through the record head.

Type as a game command: save game.

A message will appear on the screen to say that the game is being saved.

Press the RECORD keys on the datasette.

When saving is completed (about 30 seconds) the tape will stop and you will be returned to your current game (which you can continue playing if you wish).

TO LOAD A SAVED GAME

At the start, or at any stage of the game, you may restore a game position you have previously saved on tape in the following way:

Insert the rewound 'saved game' cassette in the datasette.

At any stage of the current game, type: load game.

Press the RETURN key.

A prompt will appear on the screen.

Press PLAY on the datasette.

The 'saved game' will be loaded and you will automatically be returned to the game at the stage you were at when you saved it.



If you are using a Spectrum (48K)

LOADING

Takes approximately 6 minutes.

Insert the cassette in the cassette recorder and ensure that it is fully rewound.

Type LOAD "" and press ENTER.

Press the PLAY key on your cassette recorder.

Leave the cassette in the recorder and the PLAY key depressed until three programs INIT, MOSAIC, and PEN & DARK have loaded, and the game begins. It will start running automatically.

PLAYING THE GAME

Ensure that your computer is in the CAPS LOCK mode, so that your typed command is displayed in upper case. If you find you are typing in lower case, hold the SHIFT key down and press the CAPS LOCK key once.

For players unfamiliar with the operation of the Spectrum, your commands are typed in between quotation marks, below the main display. Should one or both of the quotation marks accidentally become deleted, then to continue playing you will need to 'repair' them. Type them back in by holding down the SYMBOL SHIFT key, and pressing P. Make sure there are two sets of quotes – and only two!

If the cursor is not now enclosed between quotes, your input will still not be accepted by the computer. To correct this, hold down the CAPS SHIFT key, and press either the left arrow (on key 5) or the right arrow (on key 8) to move the cursor to the correct position.

TO SAVE A GAME POSITION

You may save your current game position so that you can turn the computer off, yet return later to the same stage in the game. To do this:

Insert a spare cassette in the cassette recorder.

Type as a game command "SAVE GAME".

The computer will announce that it is in the save game mode, and will tell you that there are 7 arrays to save.

It you are using a Spectrum (48K) continued...

Press the RECORD keys on the cassette player.

After allowing for the cassette leader tape to pass the record head of the recorder, press any key on the Spectrum to start recording the first array.

After each array is saved, its number will appear on the screen, and at the bottom of the screen will be a prompt asking you to press any key. You must press a key to initiate the saving of each array.

When saving is complete (about 75 seconds) the display will announce "ALL DONE!" and you will be returned to your current game, with the message "GAME SAVED". You may, if you wish, continue playing the current game.

TO LOAD A SAVED GAME

At the start, or at any stage of the game, you may restore a game position you have previously saved on tape in the following way:

Insert the rewind 'saved game' cassette in the recorder.

Type "LOAD GAME" and press ENTER, and the computer will announce that it is loading a game.

Press PLAY on the recorder. The saved position will be loaded, and each of the 7 saved arrays will be announced as it loads. You will then automatically be returned to the game at the stage you were at when you saved.



How to play the game

An Adventure game is one in which, by instructing the computer in simple English sentences, you act out a role in a particular situation. You may move around from place to place (GO NORTH, GO DOOR etc.), you may pick up and drop many of the objects you can see (TAKE LETTER, DROP TORCH), and you may examine and manipulate many of the objects and items you see before you.

The Pen and the Dark has a wide vocabulary, but if a word you use is not recognised, you will be told. In that case, try another similar word, or perhaps think of a different way to overcome the situation.

Respond to the prompt on the screen with 1-word or 2-word commands, typed in UPPER CASE.

The game is presented on the screen as scrolling text. Because of this, the details of your current location may disappear off the top of the screen. To redisplay and update them, simply type LOOK.

Note that each time the location details are displayed, either by typing LOOK or because you have moved from one place to another, the screen will first be cleared, so that you will lose any messages and commands previously shown.

If you wish to examine or look at something specific in the game, then the command LOOK DOOR or EXAMINE DOOR will act in a different way from LOOK on its own. If there is anything interesting to be learnt, the appropriate message will be displayed, but the location details will not be repeated.

To move around from place to place, the verb GO is used. (e.g. GO NORTH, GO DOOR). Any of the exits which are displayed on the screen may be taken by typing the first letter of the direction. (e.g. instead of GO NORTH, type N). This will speed your game up, partly because it is shorter to type, and partly because the computer will give such a command priority, and has less work to do in deciphering it.

To pick up an object, the commands TAKE and GET are recognised. To see what you are carrying, type INVENTORY or INV.

The words LOAD and SAVE apply only to loading and saving the game. Using them will put the computer into LOAD or SAVE mode. These words will not help with progress – either orthodox or unorthodox – through the game.

Because the game follows the narrative of Colin Kapp's story *The Pen and the Dark*, you will find when playing it, that you will have to go through all the various key features of the plot. Even though you may know how to deal with a particular situation in which you find yourself, due to the narrative structure of the game you will have to 'act out' the storyline.

Before starting out on your Adventure you are recommended to read the first part of the story up to the beginning of page 14. This sets the scene, and also contains valuable information which you will certainly need to be able to complete the game.

If during play you find you need help, then read through the rest of the story. This won't altogether spoil your game, although it may take out some of the excitement of discovery! On the other hand, don't think you will easily be able to complete the game just because you have read the story. Much of the adventure is set around how to obtain and use the resources necessary to complete your objective. If you are really in trouble, you can acquire a 'hints sheet' from the publishers by sending a stamped, addressed envelope to: Unorthodox Engineers Dept, Mosaic Publishing Ltd, 187 Upper Street, London N1 1RQ.

Your objective? That will be outlined to you during the opening stages! Apart from that, you are on your own! And don't forget – to complete an Unorthodox Engineers adventure, you may have to think in an unorthodox way!



THE PEN AND THE DARK

COLIN KAPP

The scudder slid through candy-floss clouds of cirrus and strato-cumulus so extremely Earthlike in formation that even the scudder's well-travelled occupants felt a twinge of nostalgia for home. Far below, the green and gilded fields proudly displayed the rich bust of the planet Ithica ripening in the rays of the G-type primary. The occasional sprawl of town or metropolis betrayed the Terran origin of Ithica's inhabitants and the results of their desire to re-create the image of a far-off homeworld. With a little imagination this could easily have been mistaken for one of the rarer spots on Earth.

But when the scudder cleared the haze of the cloud formation, the black and fearsome thing which reared above them was decidedly not of Earth.

Caught on a sudden and curious down-draught, the scudder dived steeply and then went into a mammoth power-climb that took it soaring into a wide and safe helical orbit around and finally above the hideous patch of darkness.

'So that's it!' said Lieutenant Fritz Van Noon.

Dr Maxwell Courtney nodded. 'That's it. That's what we call the Dark. What you see now is the mushroom dome. It's all of twenty-five kilometres across, and as

near indestructible as anything we've ever encountered. We put a nuclear Hell-raiser down on to it and nothing happened at all.'

Van Noon raised a swift eyebrow. 'Nothing?'

'We know the device exploded, because we were able to detect the start of the priming flash. After that—nothing. The Dark absorbed every quantum of energy released. It swallowed the whole damn lot and never so much as flickered.'

'And you say that aliens put it there?'

'So the records read. About two hundred terrayears ago—long before we re-established contact with Ithica. It would seem some sort of alien vessel made a touchdown on the edge of the city, stayed a night, then vanished as abruptly as it had come. But in its place it left this pillar of darkness, and nobody has ever found out why they left it or what it's supposed to do. There's a great many theories about it, but none which completely explains the facts. Some think that it soaks up energy and transmits it elsewhere. Some think it's contra-terrene. It's even suggested that an alien colony lives inside it.'

'And what's your own opinion?' asked Van Noon.

Courtney shrugged. 'After three years of scientific examination I still don't know what to think. At some time or another I've held most of the current physical theories only to discard them for another.'

'Is it uniform right the way down?'

'It's really shaped like a bolt,' said Courtney. 'The shaft proper is about seven kilometres in diameter and about thirty kilometres high. It is capped by the mushroom head here which extends out to about twenty-five kilometres in diameter and apparently defines the region of the Pen.'

'The Pen?' Van Noon looked up from his notes. 'What's that?'

Courtney smiled fleetingly. 'Sorry! That's local terminology. I mean the apparent penumbral shadow of reduced effects which surrounds the pillar of Dark. It's a twilight region about nine kilometres average depth, the outer reaches of which are easily penetrable, and the inner regions connect with the Dark. It has an interesting sub-climate too—but you'll see that for yourself later.'

Van Noon scowled. 'And you have no idea at all what the Dark is made of?'

Courtney spread his hands. 'It's commonly assumed to be contra-terrene, as I said, but I don't think the hypothesis holds water in the face of all the evidence. But God-alone knows what it really is. Even the Pen raises some nice problems in physics which don't have answers in any of the textbooks we know.'

'All right,' said Van Noon. 'I'd like to take a closer look at it first and come back to you when I've some idea of what questions to ask.'

'I rather hoped you'd do it that way,' Courtney said. 'We've assembled such a mass of data on the Dark that we don't know if we've lost our way in our own erudition. That's why we asked for some of you Unorthodox Engineering chaps to come out to Ithica to supply a fresh approach. The answer may be so damned obvious that we can't see it for the weight of the maths intervening.'

'And the primary object of the exercise is what?'

Courtney glanced from the window at the monstrous column of darkness which reared its head high over the landscape. 'I don't know. Study it, use it, get rid of it—it's an alien paradox, Fritz, and I don't think anyone with

an ounce of science in his makeup can let it rest there doing nothing but soaking up the sun.'

* * *

'What's the general topography of the Dark area, Jacko?'

Jacko Hine of the Unorthodox Engineers unrolled his sheaf of maps. 'This is the position of the Dark, and the area I've coloured shows the extent of the Pen. As you can see, the whole is centred on the edge of what used to be the city of Bethlem.'

'Is the city still there?'

'Its ruins are. The present city of New Bethlem has moved southwards, but in and around the Pen the remains of the old city still exist. Nobody lives there now. If you'd been into the Pen you'd understand why.'

'You've been in, then? What's it like?'

'Weird,' said Jacko. 'It's cold and dull, but the sensations aren't the usual ones of coldness and dullness. This is a different feeling entirely. I can't quite explain it, but there's something wrong with the physics of the place.'

'Then I think I'd better start there. Where's the rest of the UE squad?'

'Doing some preliminary fact-finding at the edge of the Pen. I suggest we can contact them as we go in, and see what they've found.'

'No,' said Van Noon. 'I'd sooner contact them on the way out. I want my first impressions of the Pen to be a direct personal experience. I need to get the "feel" of the thing—because I have a suspicion that this problem is going to be cracked by intuition rather than by observation. Maxwell Courtney's no fool, and he and his team

have been gathering facts for three years now. There's no sense in repeating what they've already done, so I'm going to play it my way.'

'I was rather afraid of that,' said Jacko, following in his wake.

The edgeland was an area dominated by the ruins of the old city. The transport took them to the very perimeter of the Pen, and here they dismounted. Van Noon surveyed the phenomenon thoughtfully.

The termination of the Pen was sharp, precise, and unwavering. At one point the magnificent sunshine of Ithica baked the dust golden and ripened dark berries on the hanks of hackberry-like scrub. A centimetre away the summer changed abruptly to a dark winter, shadowed and uninviting, and such scrub as grew within its bounds was thin and gnarled and bore no fruit at all.

Above them the wall of shade rose vertically until it disappeared into the cloud-ring which clung stubbornly round the sombre column. Looking into the Pen, Van Noon gained the impression of gradually increasing coldness and bleakness and gloom until, in the centre, he could just detect the absolute blackness of the great pillar of the Dark. Cautiously he extended a hand into the boundary of the Pen and withdrew it, experiencing the strange chill on his skin.

'Very curious,' he said. 'What strikes you most about this, Jacko?'

'Lack of interaction between the warmth outside and the cold inside.'

'Precisely. At a guess there's a temperature fall of fifteen degrees centigrade over a distance of one centimetre. Now there's plenty of heat capacity available out here, so why doesn't the warmth penetrate farther into the Pen?'

'There's only one answer. The heat is being removed.'

'Yes, but I don't see how. Even if you postulate that in the centre of the Pen is an area of absolute zero temperature you would still expect to get a graduated temperature rise at the boundary and not a sharp transition such as you have here.'

'So?' Jacko looked at him expectantly.

'So I can see how to achieve the inverse of this situation using, for instance, a collimated beam of infra-red heat. But a collimated shaft of coldness is something very new indeed. As you remarked, Jacko, there's something wrong with the physics of this place.'

With swift resolution Van Noon stepped through the perimeter and into the Pen. Jacko pulled up his collar and followed him in. The contrast was staggering. Whereas a few seconds previously the Ithican warmth had been sufficient to bring them to a gentle sweat, they now stood shivering with the curious chill which inhabited the Pen. Van Noon was looking with amazement at the dreary landscape and sub-climate of the Pen interior.

The bright Ithican sunlight did not penetrate. The internal winter continued sheer up to the outer wall, and such light as there was filtered downwards from a dirty, leaden cloudbase trapped within the Pen itself. Even looking sunward, no sign of the Ithican primary could be seen, though it should have been clearly visible, and its apparent loss was not explicable in terms of haze or diffraction.

The sun-toasted ruins which stood outside the Pen continued inside as a depressing waste of rotting bricks and slimed timbers, forming forgotten streets on which even the sparse and miserable vegetation had not much cared to grow. A few furred rodents scattered at their approach,

with an attitude of resignation, as if self-preservation here was a matter about which one thought twice.

Van Noon was sampling his surroundings with the detachment of a scientist, yet using his own body in lieu of instrumentation. The process went on for several minutes before he came to a conclusion.

'What do you feel, Jacko?'

'Cold.'

'Anything else?'

'Yes, dull. I don't know if it's physical or psychological, but every action seems to demand too much effort.'

'You're right there,' said Fritz. 'I found the same thing myself, and I don't think it's psychological. It's almost as if every form of energy here was negated or opposed.'

He picked up a stone. 'Watch! I want to throw it through the window in the old wall over there.'

He threw the stone with practised ease, having judged its weight to a nicety. But the stone lost speed rapidly and fell in a limp trajectory to the muddied soil several metres short of its intended target.

'See what I mean?' said Van Noon. 'That stone, accelerated to the velocity at which I released it, should at least have hit the wall. But it didn't. It acted as a lighter body might have done on travelling through these conditions—or as a body of its actual weight might have done had it somehow lost kinetic energy during flight. How do you lose kinetic energy from a body in flight, Jacko?'

'You can't lose it,' said Jacko. 'You can only react it against something—friction, air-resistance, and so on—in which case the energy leaves the system in some other form, usually heat. The energy itself is never lost, only converted.'

'But here it wasn't,' said Van Noon. 'I wasn't throwing

against a headwind, and the air in here is no more dense than outside after allowing for temperature and humidity differences. So whatever stopped that stone wasn't a normal reaction to flight. And I can find no evidence of abnormal gravity or coriolis effects. That stone just progressively lost energy. Mass times velocity doesn't seem to equal momentum in the Pen—and that's a hell of a smack at the textbooks you and I were raised on.'

'Working outside the textbooks never worried you before,' said Jacko. 'Let's get out of this place, Fritz. It's giving me the creeps.'

'In a minute, Jacko. I'd like to explore a bit farther in first.'

They walked together down the remains of a long-forgotten road, treading wearily on the slimed cobbles of the surface. The environment was desolate and forlorn, with an air of perpetual dampness and slow rot and reluctant fungus. As they penetrated to greater depths the gloom grew perceptibly greater, and the cold chill reached a degree where it would have been unwise to remain too long without the protection of additional clothing. Vegetable and animal life were here almost completely absent, and the slime and fungus showed plainly that even the lower life-forms were maintaining their hold only with the greatest difficulty. Even organic decay had not progressed far after two centuries of perpetual winter.

'What are we looking for, Fritz?'

'I don't know, Jacko. It's the feel of this cold that has me puzzled. I don't feel I'm cold just because the environment is cold. I feel I'm cold because my body is radiating more heat than it should at these temperatures. To judge from the feel of my skin it's about five degrees below freezing point here.'

'Agreed,' said Jacko. 'Well below freezing, certainly.'

'Then just an observation,' said Van Noon. 'Why aren't the puddles of water frozen? It's my guess that a thermometer wouldn't give much below ten centigrade. It's the same effect that we encountered at the perimeter of the Pen—radiant heat being opposed by something only explicable as radiant cold.'

'I don't understand that, Fritz. After all, cold is only the absence of heat.'

'I wonder,' said Van Noon, 'if that isn't a limitation to thinking which we've imposed upon ourselves. What happens if we postulate a phenomenon called contra-heat, which we treat as the conventional electromagnetic heat radiation but with the signs reversed?'

'There's no such animal,' objected Jacko.

'No? Fetch some equipment in here and compare the radiant heat loss against temperature and I think you'll find there is. There has to be. There's nothing else you could set up in an equation which would go half way to meeting all the facts.'

Something crackled and spat unexpectedly behind them with a sound like a multiple pistol shot. They whirled round and stopped in quick amazement. Between them and their path out of the Pen was quite the smallest and darkest and lowest thundercloud they had ever seen. The bottom of the cloud hung probably not more than thirty metres above the ground, and its inky-black consistency made them think of vapours other than those of the air, though this was probably a trick of light and circumstance.

But it was the lightning which gave them pause to think: vicious arcs between ground and cloud which started to stab with all the anticipated brilliance and fire

but which were curiously extinguished by some constrictive phenomenon which pinched the plasma and quenched the arc. The result was a staccato 'pop' instead of a thunderclap, and a rate of lightning repetition which occasionally generated a continuous tearing noise rather than the usual sounds of storm. But there was no doubting the destructive potential of the lightning bolts.

Moved by unfelt winds, the thundercloud was drawing rapidly nearer, and Van Noon was more than a little apprehensive.

'Better find some shelter, Jacko. This could be dangerous.'

They looked about them. The ruins of a hovel, partly roofed with sloped and perilous slates, provided the nearest offer of sanctuary. This they accepted, and squatted within the miserable, damp, boxlike walls while the cloud moved overhead. Lightning stabbed at the path outside with a viciousness which seemed to contain some element of personal malice, but finally it passed. The cloud went spitting and snarling on towards the pillar of the Dark, and Van Noon and Jacko emerged to watch its progress.

'I'll teach Maxwell Courtney to speak of "interesting sub-climate,"' said Van Noon ominously. 'Let's get out of here, Jacko.'

'You know, Fritz, I was just about to suggest the self-same thing myself.'

* * *

'That was what they call a rogue storm,' said Courtney. 'In the Pen you meet them quite a lot. They seem to form and disperse almost spontaneously, but while they last

they can be very dangerous. They always travel fast, and always in straight lines. If caught in the open we avoid them by simply running out of the way.'

They were seated in Courtney's office in New Bethlem, and the broad windows of the room opened to a distant view of the Pen and its core of Dark. Courtney's desk faced the window as if to give him a constant reminder of the broad enigma to which his life was currently dedicated. The attitude of his visitors' chairs showed that they were no less aware of the dominating influence of the looming column of shades.

'Well,' said Van Noon. 'We've gathered a little data of our own on a preliminary survey, and I'm told you have acquired data by the ton. That puts you in a good position for answering questions, and me for asking them.'

'Ask away,' said Courtney. 'I don't pretend to have all the answers, but I can do you a nice line in inexplicable facts.'

'What can you tell me about anti-energy or contra-energy effects?'

Courtney whistled softly. 'That's a piece of fast thinking, Fritz. It took us two years before we could bring ourselves to consider the hypothesis seriously. But I know what you're thinking. Most of the physical effects observed in the Pen can be satisfactorily explained only by thinking in terms of polar opposition—negation by precisely defined effects of exactly opposite character. The fact that these opposite effects are completely unknown to nature outside the Pen doesn't necessarily invalidate the case for their existence inside the Pen. The very nature of the Pen and the Dark is obviously extra-physical, or we'd not have a problem in the first place.'

'Precisely!' said Van Noon. 'But you do admit the possibility of contra-energy?'

Courtney spread his hands. 'I admit it as a possibility. It's certainly a basic premise which fits all the observed facts in the Pen. But it's only one premise among many, and it doesn't have much to commend it when you consider it a little deeper.'

'Go on,' said Van Noon.

'Let's take an extreme case,' said Courtney. 'You can prove it for yourself, or take my word for it, that the difference between the Pen and the Dark is purely one of degree. Whereas energy negation in the Pen is only partial, that of the Dark is absolute.'

'I'll take your word for it. I'd guessed it anyway.'

'Good. Now consider this: no matter what intensity, character, or type of energy we have applied to the Dark, we have had no discernible effect upon it, nor have we been able to pass any energy through even a thin sector of it. We have encountered absolute negation, Fritz, of any energy applied in any way. If you stick to your contra theory the implications are too complex to be true, and rather frightening.'

'I think I understand you,' said Van Noon, 'but I'd rather hear it your way.'

'I'll put it as simply as I can. If we fire a projectile at it, according to your theory that projectile needs to be met precisely at the perimeter of the Dark by what is effectively a counter projectile of identical mass travelling at an identical velocity to a precisely identical point. That makes too many coincidences for my orthodox-type stomach. And again, suppose we use X-ray bombardment or any other form of radiation. For precise negation this would need to be met at the identical point by contra

radiation of the same intensity, wavelength, and phase as that which we apply. Either the Dark is an extremely broadband transmitter capable of producing any type of force, energy, intensity, and phase of radiation at any point on its perimeter at any instant without prior notice—accurately and instantaneously—or else the Dark is full of little green men with an uncanny knack of anticipating our test programme and arranging their contra facilities to suit.'

'I get the point,' said Fritz. 'How do you arrange to fire a projectile to meet an unexpected projectile head-on with precisely matched mass and velocity and to an impact position pre-determined to an accuracy of plus or minus a few microns? It can't be done. You've shaken some of my confidence, but you still haven't encompassed the impossible.'

'No? Then I'll do so right away. For your contra theory to be true, the Dark would need to be a dynamic entity. It must necessarily give out exactly as much energy as it receives, for the negation to be complete. It's been here for two hundred years, Fritz. Now calculate two hundred years of radiant energy from the Ithican sun alone and then add what we've flung at it in the last three years of experiment. You'll see that it would need the energy resources of a small star in order to have the reserves to meet any demand. We dropped a nuclear Hell-raiser on it, and a Hell-raiser is a planet-buster, remember. What sort of power supply could conceivably meet a demand like that instantaneously?'

'I don't know,' said Van Noon, 'but we can't yet claim to know the ultimate in power sources. But very soon I intend to find a way into the Dark, and then perhaps we'll find out.'

'You can't do it, Fritz. There isn't a ghost of a chance of penetrating into the Dark.'

'I think there is. And I think I know the very way in which it might be done.'

'Whatever made you say that?' asked Jacko anxiously, as they left the room.

'It's a feeling I have,' said Van Noon. 'I said I was going to play this by intuition, and right now my intuition tells me that the Pen and the Dark *are* contra-energy effects.'

'In spite of what Courtney said?'

'Certainly. I must admit he had a nice point about the projectile needing to be met effectively by a contra projectile if the contra-energy theory was to be maintained. It wouldn't actually need to be met by a contra projectile, but merely by an opposing force of the right sort applied in the right place at the right time. I don't doubt that Courtney's correct that such a negation is necessary to substantiate the contra theory. But I do suspect that his data on absolute negation is not quite as complete as he imagines.'

'In what way, Fritz?'

'Well, I can't conceive of a continuous pattern of negative energy which could deal with any sort of force or radiation applied at any point at any time. I can, however, conceive of a pattern of contra radiation or effect which is selectively produced in response to a particular stimulus at a particular point. But you see what this involves?'

'No,' said Jacko.

'It involves detection, analysis, and synthesis of a contra effect. Three steps—which must necessitate some sort of time-lag. Courtney has established that any applied energy is negated—but I doubt if it can be negated

instantaneously. The three steps may be completed in nano-seconds, but I'm quite sure that a time-lag must exist. Now I want to go into the Pen, right up to the Dark perimeter, and see if we can prove or disprove this.'

'And if we prove it?'

'Then I think we'll have a way to drive a tunnel into the Dark and see what's inside.'

Jacko lost his power of speech as his mind strove to contain the enormity of the project. Fritz shot him an amused glance, and continued.

'There's a particular reason I want to go in, Jacko. There's a second principle involved in this detection, analysis, contra-synthesis set-up which you might not have thought of. Something else is implied . . . and that something is some form of guiding intelligence.'

* * *

They had chosen heavy caterpillar crawlers for their transport into the Pen. The choice was determined not only by the fact that a tracked vehicle was an advantage over the broken terrain but also for the reason that the vehicles possessed magnificently powerful engines and an ample reserve of power. Three crawlers were obtained for the expedition; one to run well ahead, one to act as reserve, and one to stay well in the rear with sufficient rescue equipment to recover either of the leading crawlers should the deeper Pen effects exceed the capacity of the engines to keep the vehicles in motion.

Clothing for the party had been chosen for a simple property—thermal insulation. Although the actual temperature of the deep Pen probably did not reach freezing point it was essential to insulate the radiant heat of a

man's body against the contra-heat effect which would otherwise have striven to reduce the temperature of a man to the ambient point, with lethal effect. In this way the cold of the Pen differed from normal cold, and the expeditionary figures were clad as though for a journey to the arctic.

Once clear into the outer perimeter of the Pen and out of the strong Ithican sunshine, the expedition began to appreciate the clothing which up to that point had caused them a barely tolerable condition of overheating. Now, as the light faded and the chill of the perpetual winter closed around them, they grew more comfortable. But the underlying seriousness of the venture was pointed-up by a change in the engine note to a more laboured level as both the functioning of the engine and the momentum of the vehicle were affected by the contra elements of the Pen.

The leading crawler carried the bulk of the equipment, especially the precious lasers with which it was hoped to establish the existence of a time-lag in the Dark phenomena. Van Noon was captaining the vehicle. Jacko was driving, and Pederson, an observer sent by Courtney, completed the party. Van Noon had intended their route to follow a road indicated on the old maps as running for nearly two kilometres straight in the direction of the axis of the Dark. The intention was abandoned quickly on finding that a building of considerable proportions had collapsed, turning part of the road into an unnavigable pile of masonry. The maps were forgotten and a new route was improvised as the situation demanded, having regard to the abilities of the crawler and taking advantage of the opportunities presented by the slow erosion of the Pen environment on the fabric of the old town.

The light from the trapped cloudbase became increasingly leaden and dull until, at about five kilometres in from the perimeter of the Pen, Jacko was forced to switch on the headlamps. Their effect was negligible. Such light as they produced was robbed by some contra effect in the Pen environment and did little to disperse the muddy gloom. Van Noon had anticipated this and had a search-light mounted on the roof of the crawler. The intensity of light from this was sufficient to permit their passage through the damp, dilapidated, ghost-like streets of Bethlem to within two kilometres of the Dark itself. Then that illumination too became inadequate.

'Better get out, Jacko, and let's estimate the situation,' said Van Noon.

They descended, conscious of the acute contra-heat coldness which searched at their shrouded faces and probed at their wrists and ankles. They were conscious too, now, of contra-momentum, which gave an entirely false impression of the density of the air, since the effect was remarkably like trying to move under water.

Pederson joined them, and they made a brief survey of the situation. Whereas from a greater distance the column of the Dark had been clearly visible, it was now merged into the claylike blankness of scene which made it scarcely distinguishable as a separate entity. Jacko tried the radio communicator, but the instrument was dead save for some rare static from a distant rogue storm. The magnetic compass also had become non-functional much earlier, and though the gyro-compass still purred unhappily in its box its readings were questionable in view of the conditions under which it was operating.

The quality of light from the cloudbase was curious and unreal. Effectively the light from above should have given

them far greater incident and reflected illumination than they actually experienced. This drastic attenuation of the light should have been explicable in terms of fog or haze, but nothing such existed, and their inexpressibly dreary state of near-night had no explanation save for that of an alien opposition to the fundamental laws of physics.

'What are we going to do, Fritz?' Jacko's own attempt to resolve the situation had reached an impasse.

Van Noon looked back, hoping for an indication as to whether or not the second crawler had been able to follow their tortuous route to the spot. No evidence was forthcoming, so he shrugged his shoulders.

'You two can vote me down if you want to, but I propose that we choose the most likely direction for the Dark and just drive blind until we hit it or stop.'

'I'm with you,' said Jacko. 'What about you, Peder-son?'

'Count me in. I've no ambition to walk back on my own.'

They re-entered the crawler. Having decided on the most probable direction of the Dark, Jacko orientated the vehicle, locked the tracks on synchronization, and proceeded to drive straight into the unknown.

The journey was a driver's conception of Hell, a nightmare route across unfamiliar territory, effectively blind, and with no warning of what obstacle might halt or jolt them. Added to this was the rising resistance to movement, both on the part of the vehicle and of its occupants. Inside the driving cab even the instrument lights had become impossible to see, and the penetrating coldness finalized the depression which was settling over the spearhead of the expedition. Once or twice Jacko questioned whether they ought to attempt to turn back. Van Noon

chided him gently and looked only ahead to the point where the darkness ought to terminate in a meeting with the absolute of the Dark.

Constantly the vehicle rolled and bucked, and canted at dangerous angles as it encountered broken walls or piles of debris in its path. Sometimes it stopped with a bruising shock against some obstacle beyond its power to move. Jacko was skilful in such emergencies and withdrew the vehicle from each such predicament without stalling the engine, knowing that a stopped engine this far into the Pen would never be restarted. Bruised, and in constant danger of masonry from grazed walls crushing the cab, they endured the journey patiently; although with various deviations from the course which the presence of unsurmountable obstacles forced on Jacko, they had no certain idea if they were still headed towards the Dark at all.

Then came the moment they had been dreading. In pitch darkness now, the crawler came to a sudden halt against something immovable. The tracks churned the soft floor uselessly for a half second, and then the engine stalled before Jacko could throw the vehicle in reverse. He tried the ignition cycle in vain, but the contra effects were too powerful to permit the heavy engine to be restarted. The silence grew absolute save for the tick-tick of metal cooling rapidly and Fritz's voice cursing in a strangely muted way.

'End of the line,' said Jacko finally.

Van Noon opened the door. 'As we've managed to get here we may as well see where we are,' he said.

They climbed out. Their powerful torches were about as useful as glow-worms, and permitted an examination of no object more distant than about a quarter of a metre.

Beyond this was darkness in all directions except directly vertical, where a muddied stain across the sky mocked them with its inability to provide any useful illumination on the ground. Van Noon searched around him and picked up a short length of rotting timber with which he cast about in the darkness on all sides. Then he called urgently.

'Jacko, are you near the crawler?'

'I am,' said Pederson. 'Just by the cab door.' He banged the metal, which returned a dull and unrewarding thud. Like their voices, the sound was strangely attenuated.

'Good! Now, Jacko, can you place yourself by sound in a line between our two voices?'

Jacko moved somewhere in the darkness. 'I think I'm there.'

'Right. Now we're three in a line, with Pederson on the right, you central, and myself on the left. As far as I can make out, about three paces ahead of us is the Dark. Find something to probe it with, and don't touch it even with your gloves. Maintain your orientation carefully so that you don't lose direction and walk into it. It could be very dangerous to touch.'

They advanced slowly, Pederson tapping the side of the crawler for identification, and Fritz and Jacko talking so that the sound of voices gave their relative positions. Even so, Jacko got there first. His probe was a shard of splintered ceramic with which he was striking before him as though at some anticipated enemy. Contra-momentum made this a difficult movement to achieve, and the darkness added to the soup-like resistance to movement, giving the whole situation a dream-like character without the visual qualities of the conventional nightmare.

Then Jacko hit the Dark. It was detectable by its com-

plete negation of the force with which he struck it. And it returned no sound, and in this way was distinguishable from any ordinary obstacle struck with force.

'Got it,' said Jacko. 'But that knocking sound you hear is my knees. I admit I'm frightened of this thing, Fritz.'

'I'm not exactly keen on it, either,' said Van Noon. 'But this is what we came to see. It's a pity we can't see it now we've got here. Have you any suggestions, Pederson?'

'I've just discovered the Dark is what we ran the crawler into. No wonder it didn't move.'

An ominous and familiar staccato rattle made them turn. A rogue storm, travelling towards them and parallel to the wall of the Dark, was making its passage known by its peculiarly pinched lightning. Because of attenuation, the lightning and thunder had been undetectable even from a short distance, and the storm was almost upon them before they were aware it existed. There was no time to seek shelter. They flung themselves down on the damp earth at the foot of the Dark and waited for it to pass. It sprayed the area with quenched fire as it went, doing no damage to them, but the intensity of the arcs was such that momentarily they had a clear picture of their situation.

The Dark was just in front of them, a sheer wall of unblemished black-velvet nothingness, impossibly perfect. The crawler had nosed head-on up to the black wall, and its tracks were pressed hard against the exterior. On all other sides of them lay the ghost-suburb of desolate ruins, the reflecting white teeth of broken masonry contrasting with the wet, black soilstones of the earth.

As soon as the worst of the storm was over, they climbed back to their feet.

'What are you going to do, Fritz? Try the lasers?'

'I don't know.' Fritz had moved back to the crawler and was examining the tracks in contact with the Dark by the spasmodic light of the rapidly waning storm. 'I don't think we need to, Jacko. I think I've got my answer. You see, it did take time for the Dark to analyse and apply a counterforce to stop the crawler. But that fraction of a second was sufficient for something significant to happen. The crawler tracks have penetrated very slightly into the Dark.'

It was impossible for the others to verify Van Noon's statement since the light from the storm had rapidly become eclipsed by the strength of the contra effects. The combined output of searchlight and torches failed to re-establish the point, and the lasers refused to function from the crawler's emergency power supply. But Van Noon was sufficiently convinced of what he had seen to regard the expedition as a success.

'All we have to do now is to get back to tell the tale,' said Jacko, unhappily.

They started back by the only means available—they walked. For the first half kilometre they stumbled blindly through the darkness and the nightmare of contra-momentum. The coldness, too, was becoming serious now that they were exposed for a long period without the protection of the crawler cab. But gradually their eyes, accustomed to complete darkness began to discern light like the first touch of dawn, and with the returning ability to see, they no longer blundered into blind paths in the ruins from which they had to retreat by sense of touch alone. And the contra effects grew slightly less, so that their pace progressively improved as they made their way out of the deep Pen regions.

Two kilometres away from the Dark they came across the crushed path that their own crawler had made on its way in, and this they followed gratefully. Shortly they found the second crawler, abandoned, and with its engine stalled and cold. The third crawler was patrolling a broad front along a road about three kilometres radius from the Dark perimeter. They were hailed and taken aboard for the last part of the journey through the growing light and finally out into the unbearably bright gold sunset of an Ithican evening.

Courtney was there to greet them. His team had spent the day re-running exploratory tests, but this time with particular reference to the onset-time of negation. His results amply confirmed Van Noon's experience. There was a time-lag on the introduction of any energy phenomenon to the Dark or the Pen before negation set in. The exact period of the lag varied with the type of phenomenon, but was greatest for applied physical force.

The Ithican government, sensing promise in the issue, had already granted almost unlimited facilities to aid any practical application of the idea. On Van Noon's behalf Courtney had accepted the challenge, and the party rode with buoyant spirits back to New Bethlem where work on the next phase of Fritz's plans against the Dark were just about to begin.

* * *

'A tunnel?' said Jacko.

'Strictly speaking,' said Van Noon, 'I had in mind something more in the nature of a horizontal well, but I think a tunnel is a fair description.'

'And just how do you propose to sink a horizontal well into the Dark?'

'Frankly, I don't see much difficulty. We take an ordinary iron pipe of sufficient dimension to permit the passage of a man—and just knock it in.'

'Crazy like a fox!' said Jacko. 'We're talking about the Dark—the great energy negator. In the name of Moses, how do you just knock a pipe into that?'

'I thought I'd already demonstrated that,' said Fritz. 'There's a time-lag before the onset of negation. Apply a pile driver or something to your pipe and hit it once and it will penetrate the Dark just a little before the detection, analysis, contra synthesis has a chance to stop it. Then the negation will be applied and stop the tube going in any farther, and the system will reach stasis. The contra-force obviously cannot continue to be applied after the original force has ceased to operate, so the force, contra-force balance will then relax.'

'So?'

'So then you hit your pipe again and drive it in a little more. And so on. And providing you work on a completely random and non-predictable basis there's no chance of the contra-force being applied in anticipation. I suspect that only if we set up a standard repetition rate will we meet with complete and instantaneous negation of the force that we apply.'

'So we knock in our tube. Then what?'

'It depends on what we find. The Dark may be a solid or it may be a thin-wall phenomenon. If it's a solid we shall not gain much except for a little knowledge. But if it's thin-wall, then we might have a chance to look inside.'

'From which you're assuming that the Dark effect won't penetrate inside the pipe.'

'I think it may to some extent, but take any physical phenomenon and place an inch of steel in front of it and

you always get some modification or attenuation, if not a complete shutoff. I don't see that the situation should be materially different for contra-physical phenomena. With a bit of luck we should be able to get through.'

'What do you think's inside there, Fritz?'

'As I see it, Jacko, some form of intelligence, but I wouldn't like to guess any closer than that. Whether the Dark is some cosmic amoeba or has inside it a complex of little green men is something I intend to find out. Are you with me?'

'I'm right behind you,' said Jacko. 'But don't ask me to be the first man through that ruddy pipe.'

* * *

By the time that Courtney returned to the base camp a few days later Van Noon's plans were fairly well advanced. Fritz described the scheme briefly. Courtney was intrigued but doubtful.

'I don't see,' he said, 'how you're going to drive a pipe of that diameter into the Dark—remembering that the driving has to be done in the deep Pen area where the contra-momentum is killing. You'd never get a horizontal pile-driver to work under those conditions.'

'No. We've already taken care of that point by taking a new line entirely. We're going to fire it in.'

'Fire it?'

'Yes. Attach the free end of the pipe to what is effectively a large-bore gun or reaction chamber with an open muzzle pointing away from the Dark. In the gun we fire a high-explosive charge and let the recoil of the apparatus drive the pipe against the Dark. According to my calculations, a series of explosive shocks should have the right

sort of driving characteristics for the job. How does it sound as an idea?’

‘It could work,’ admitted Courtney. ‘Unless we’re up against something we don’t know about yet. How far have you got with the project.’

‘We’ve managed to get the lengths of pipe into the Dark area, and the gun chamber is there also. There’s trouble keeping handling equipment working so far into the Pen, but we’ve managed somehow. We should be ready to start firing sometime tomorrow. Have you been able to get the extra stuff I asked for?’

‘Most of it’s outside on the carriers, and the generators will arrive in the morning. Here’s the radiation monitor, trolley-mounted as specified. I only hope it fits into the pipe.’

‘I’ll try it out,’ said Van Noon. ‘I can run it through our test length and if it doesn’t fit we can modify it before it goes into the Pen.’

He wheeled the small apparatus-laden trolley to the length of pipe that ran down the workshop where they had been fabricating the gun chamber. The trolley fitted easily into the interior of the pipe and, to give himself a little practice, he crawled in after it and pushed it before him. The iron confines of the pipe returned the roar of the small casters with a noise like a train speeding through a tunnel. When Van Noon reached the far end he found that Jacko had returned and was peering anxiously down the pipe.

‘Why the sound effects, Fritz?’

‘Eh? Oh, this? It’s the radiation detector. It’s obvious that even the iron of the pipe can’t do more than attenuate some wave lengths of the electromagnetic spectrum—and the same presumably applies to the contra spectrum. So

just to be on the safe side Courtney has knocked up a combined range monitor which should cover anything likely to be dangerous but not detectable by our own senses. I don’t expect that we’ll encounter any such radiation, but it’s better to be safe than sterile.’

‘Agreed,’ said Jacko. ‘We’re taking enough chances with the unknown already. I’ve just come back out of the Pen, and we’re right on schedule. The first firing can take place at mid-day tomorrow.’

‘I’ll be there,’ said Fritz. ‘I’m particularly interested in knowing what happens to the core which we leave in the pipe. If the Dark is true radiation-type phenomena, there won’t be any core material. But if it’s something else, we may have to think again.’

* * *

The null-pressure suits obtained from Space Command were far more suitable for working under deep Pen conditions than the expeditionary clothing had been. Specifically designed for work on asteroids and similar bodies under a pressure dome but exposed to extremes of stellar heat and cold, the suits were the finest flexibilized radiation foils that had yet been devised. In the Pen, of course, no pressurized dome was needed, but the suits ensured that the searching fingers of contra-heat were no longer a danger or of major discomfort to the UE squad.

But the drag of the contra-momentum was not so easily avoided. Close to the wall of the Dark it exhibited an almost treacle-like resistance to movement which was common to both men and machines alike. The adaptations of technique needed for working in an environment possessing such a high quasi-viscosity were numerous, but

the combined ingenuity of the Unorthodox Engineering squad was equal to the challenge. Somehow the impossible had been accomplished, and the structural components of Van Noon's tunnel had been patiently swung into place ready for the projected penetration of the Dark.

'Ready to fire?'

Jacko nodded. 'First shot in thirty seconds.'

They were watching the scene by the light of two large continuously operating lasers which Courtney had managed to obtain. These were directed on the point where the leading end of the pipe was pressed hard against the Dark perimeter. The illumination, spread slightly by deliberate diffusion with mesh screens, was adequate despite the contra-radiation loss. The backscatter illumination was also quite useful around the working area, but was attenuated sharply and unnaturally with distance. The power for the lasers had to be derived from outside the Pen via cable, and the contra-electrical loss was such that two large generators were needed to drive sufficient energy in to keep the lasers in operation.

The first shot was fired. The sound of the explosion was incredibly muted, and the tongue of flame from the reaction chamber was quickly quenched and drained. Van Noon examined the junction between the pipe and the Dark.

'I think it's working, Jacko. Only millimetres so far, but it's definitely going in. Keep firing rapidly but erratically. Let me know when you're in about a metre. Then I want to go down inside the pipe and see if any sort of core is left.'

By reason of good organization on Jacko's part they had penetrated a metre by late afternoon. Then the gun

chamber was removed to allow access to the free end of the pipe. Van Noon had a line measured to a pipe's length minus one metre, and one end he left clamped to the free end of the pipe while he took the rest of the line inside to give him an indication of his position. Ten minutes later he came out jubilant.

'No core material, Jacko. The pipe is clear to the very end, and then the Dark begins again. That means we've got a metre of clear tunnel already and no complications so far. Now I want firings to continue right round the clock, as close-spaced as possible without setting up a standard repetition rate. If you scatter the charges round the area a bit so that each has to be fetched from a slightly different distance, that should be sufficient. But I want the depth of penetration per shot carefully watched, and if it varies very much from the existing rate, cease firing and let me know.'

It took forty hours to drive the first length of pipe into the Dark. By this time a second length had been added to the first and there were indications that the depth of penetration per shot was increasing. The second was driven home in twenty-five hours, partly due to the decreasing resistance it encountered, and partly due to the increasing proficiency of the shot-firers.

The third pipe was inserted in seventeen hours, and the fourth, in twelve. The time for subsequent pipes decreased in rough proportion. The tenth went half way, and then the indications were that no great resistance was being offered to it by the Dark since the assembly of pipes now moved forward the full theoretical distance per shot that they would have moved in the Pen itself. Jacko brought his charts to Van Noon.

'I think we're through, Fritz. These seem to show that

the Dark is a relatively thin-wall phenomenon with its effects decreasing with depth of penetration and reaching virtually zero at about ninety-five metres. God alone knows what's at the other end.'

'Take the gun chamber off, Jacko, but be careful in case something unexpected comes out of the pipe. If nothing happens in half an hour then I'm going through to have a look.'

Nothing did happen. The end of the pipe protruding from the Dark remained empty, silent and cold; and there was no way of telling what lay at the far end. A laser directed down the pipe returned nothing but light-scatter from walls and motes of dust. The only factor of note was a strong current of air entering the pipe as though to equalize some unexplained deficiency in pressure.

Finally Van Noon hoisted the radiation trolley into the pipe and followed it in.

'I'm going down a bit, Jacko, for a preliminary survey. Stand by with some weapons in case I come out fast with something after me.'

'Nothing doing!' said Jacko. 'If you're going down that pipe, then I'm coming too.'

'That's what I hoped you'd say,' said Fritz. 'Let's get on with it. The situation won't improve itself by waiting.'

He crawled into the pipe. With some misgivings, Jacko followed him in. Ahead of Fritz the radiation trolley clattered on the iron and raised a multitude of clamorous echoes which engulfed them in a tide of sound. Inside the pipe the contra-sound attenuation apparently did not operate to anything like the same degree as that encountered in the Pen. The radiation monitor gave no indication of any increase in rate above the slow background count, and they considered it safe to continue.

Occasionally Van Noon stopped and let the echoes die, but nothing else disturbed the silence except their own breathing and their own awkward movements in the confines of the pipe. Then after what seemed an eternity of crawling the clatter of the trolley ceased again and Van Noon stopped and half twisted himself to look back.

'Jacko,' he said urgently, 'think very carefully. Are you absolutely sure how many lengths of pipe we drove into the Dark?'

'A ruddy fine time to be concerned about the economics of the project.'

'Hang the economics! Are you sure?'

'Certainly. Ten in all. Why?'

'I've been counting the joins. I'm now in the twelfth pipe, that's why.'

'Don't make jokes like that, Fritz. You'll give me heart failure.'

'I wasn't joking. The casters on the trolley drop into the flange gap at every join, and I have to ease them over. That's what made me start counting how many joins I'd passed.'

'So you're now in the twelfth pipe out of the original ten,' said Jacko, still not fully convinced. 'That's quite a trick! How do you explain it, Fritz?'

'Contra-iron pipe,' said Van Noon. 'Lord! I thought it was a joke when Courtney suggested that they stopped a projectile with a contra projectile. But it appears it wasn't. They do just that. They tried to stop our pipe with a length of contra-iron pipe so precisely similar that I'd not have noticed the difference had I not been counting. What type of creatures could do that, Jacko—almost instantaneously?'

'I don't know,' said Jacko. 'But I'm afraid of them.'

'You and me both. To work a trick like that must demand a technology centuries ahead of ours. But even so, I've a feeling we've got them worried.'

'Why's that?'

'Because if they were still operating at full efficiency there's something we'd logically have met in this pipe before now—a contra-radiation monitoring trolley pushed by a contra Fritz Van Noon.'

* * *

'We're way out of our depth, Fritz,' said Jacko finally.

'Are you still going on?'

'If you're still following.'

'I'm still behind you, but I'm darned if I know why. I've followed you into some crazy situations before, but this has the lot beaten.'

They moved on, the roar of the trolley casters echoing and reverberating around them and occasionally stopping as Fritz eased the little wheels over a flange gap.

'Just entering pipe nineteen,' said Van Noon finally. 'If they provided as many as we did then there's only one to go.'

'See anything yet?'

'Not an atom.'

'I was just thinking, Fritz. It'd be a neat trick if they'd connected an infinity of pipes together. We could go on crawling through here till Judgment Day.'

'Good point, Jacko. We'll reconsider the position when we get to the end of number twenty.'

Again the trolley roared and stopped.

'Just entering pipe twenty,' said Van Noon.

'Let's get it over with,' said Jacko. 'I feel like a go-devil working overtime.'

'Right. This is it!'

The trolley was moving slowly now, with Fritz concentrating on every centimetre of its progress, using the feel of the iron instead of eyes. There was no way to measure distance in the darkness. The only way was to crawl and to hope that one remembered the feeling of crawling a length of pipe. Then a sudden cessation of noise, with the echoes slowly sinking around them.

'End of pipe,' said Van Noon. 'But no resistance. The trolley is half way out of the end but I still can't see a thing. I'm going to let the trolley go and see what happens.'

There was a brief scrape of metal on metal, and the thump of something on the pipe.

'It fell down,' said Van Noon, 'but not very far. I can still feel it with my hand. And something else . . . There's no contra-momentum out here. I can move quite freely. It isn't even very cold. It must mean we're well inside the wall of the Dark. I wonder if the torch will work.'

The torch did work. In the darkness the light touched the interior of the pipe with an intensity that was momentarily dazzling. Projected outwards, the beam was clearly visible but it contacted nothing that reflected except the wet, brown stones of the earth, and the radiation trolley fallen on its side. Ostensibly they were looking into night, bare and empty, but Fritz was not convinced.

'This isn't darkness,' said Van Noon. 'It's more like veils of darkness . . . thin layers of contra-light. See how the torch beam falls off in discrete quanta. I'm going out there, Jacko, to see if I can make head or tail of this. You stay by the pipe with a torch ready to guide me back. I'd

very much like to find out who or what it was that put ten pipes on the end of ours.'

'And I'm going to wish you luck,' Jacko said. 'I'm not at all sure I want to know.'

Van Noon dropped to the ground. The soil underfoot was an obvious continuation of the old town terrain. His torch illuminated the stony earth for many metres in front of him, but it was useless when directed horizontally in any direction because of the apparent lack of anything to reflect the light.

But he was right in his observation that the intensity of the light was stepped-down by curtaining veils of something. As he approached a veil he could see a distinct drop in the brightness of the beam as it was intercepted by something dark and nebulous. He reached the veil and touched it, curiously. His fingers encountered nothing, and he walked through it without sensation. Looking back, he was glad still to be able to see the light from Jacko's torch, but he knew that if he passed through many veils even that would be lost to him.

But the situation changed without warning. The fifth veil was not insubstantial at all. It was a film of something like dark, thin-blown glass, and he shattered it with his torch because he had not known of its solidity. And as it shattered, light from beyond spilled out through the broken edges and he had the briefest glimpse of the scene of gold-hazed wonder . . . and then the air exploded in his face.

And even the explosion was unreal. The blast caught him not from in front but from behind and above, moving towards the explosion rather than from it. It tumbled him forward and pinned his body to the ground with a great pressure. Desperately he fought to raise his neck and

shoulders for a further glimpse of the creatures who lived in their sanctuary deep inside the hollow Dark. He wanted a better look at the godlike machines they controlled, now rising high like gossamer and congregating in the golden light as they swept magnificently upwards almost faster than the eye could follow. But a sheet of flame crackled and tore across the vastness of the area and whipped high in an angry, explosive tide.

A shockfront of pressure tore him from the ground, then dropped him cruelly. Despite the hurt he fought to retain consciousness and turn and watch the exodus of the gods. But the forces acting on him were too great. Instead he was swamped by darkness.

* * *

His next impression was that of Courtney's face and the sense of lapsed hours. He felt bruised and shaken, but not seriously hurt. He was lying in the open, and the Ithican sky above was broadly trailed with the colours of the sunset.

Courtney came up and put a folded coat beneath his head and a blanket over his body.

'Take it easy, Fritz. There's a doctor on his way.'

Van Noon smiled wanly. He tried to sit up, then thought better of it. 'Is this where the Dark was, or did you get me out.'

Courtney sat down beside him. 'The Dark's gone, Fritz. I don't know what you did, but you certainly made a good job of it. The whole darn thing imploded. It was a fantastic sight. The Dark and the Pen drew up together, then spiraled like a whirlwind. There was a blast which broke every window in New Bethlem . . . and then the whole complex just disappeared.'

'I know what did it,' said Van Noon. 'Our atmosphere reacted with theirs with a sort of mutual destructiveness. It was the total reaction of mass with mass—complete consumption of both and no by-product. It was our tunnel let the air through, and I broke the last seal by accident. And once the reaction started, nothing could stop it.'

'So it was contra-terrene!' said Courtney.

'Deep inside, yes. And I'd guess that the purpose of the Dark was to act as a form of barrier against the contra world outside—an insulator separating the opposed atomic conditions. They must have tried to maintain it against penetration by every trick they knew. But what damned them was a simple slip of logic. They stopped a hollow object with a hollow object . . . and forgot the hole inside. But even so, we were lucky to get through.'

'Lucky?'

'Yes,' said Fritz. 'We were operating on the wrong principle. There was no detection, analysis, synthesis reaction involved. There didn't need to be, not the way they did it.'

'I don't follow, Fritz.'

'I missed the point myself at first, but there's only one logical answer to the detection and negation of any phenomena applied anywhere at any time . . . They did it with mirrors.'

'Mirrors?'

'Yes. Not ordinary mirrors, of course, but using a reflecting principle capable of producing the exact and true physical inverse of whatever comes into its field—a mirror that works not only with light but over the entire region of physical and force phenomena, including matter itself.'

'My God!' said Courtney. 'It's a fascinating concept.'

'I'd give anything to know the mechanics of it,' said Van Noon. 'The reflector wasn't a simple plane, it was a three-dimensional cavity about ninety metres deep between the inner and outer walls. And somehow in that space were reproduced contra-physical objects rather than mere images. And in our innocence we had the temerity to bore right through the "glass" to the back.'

'That's where you have me puzzled by this mirror hypothesis, Fritz. It doesn't seem to fit the facts. Your breakthrough was dependent on the assumed detection-analysis-synthesis trinity, and it worked. But the theory assumed a delay time was inherent. But a mirror has no time-lag. Its returned image is instantaneous.'

'That's not true,' objected Van Noon. 'The image returned by a mirror is never instantaneous. Light travels from the object to the glass at a finite velocity, and through the glass at a different but also finite velocity. So the image returned to the object is always delayed in time by just twice the time it takes light to reach the reflector. We were lucky in that in their contra mirror the effect was even more pronounced for the type of phenomenon in which we were interested.'

Courtney absorbed this in silence for a moment or two. Then: 'What put you on to the idea, Fritz?'

'Primarily your point about their power output having to match the total power input from all sources. It seemed improbable they would have chosen such a dynamic and wasteful method of maintaining a long-term defence. But a reflection principle has no such disadvantage. A mirror returns only when it receives. It needs no power to return the image. And when I got into the cavity and found nothing there but the image-iron pipes by which we'd just arrived, I knew that reflection was the only answer. But

like a damn fool I went and blundered through the "silvering" on the back of this mirror.'

He leaned back momentarily and closed his eyes, trying to recapture an image in his own head. 'What happened to *them*, Maxwell? Did they get away?'

Courtney turned his head to look at the sunset.

'No. They didn't make it, Fritz. They reached the stratosphere in those machines of theirs, but then they exploded. Thank God the power release was too high to do much damage!'

'It's a pity,' said Fritz. 'I'd sooner have got to know them than have destroyed them. We could have learnt an awful lot from people who could build mirrors like that.'

'Had they been inclined to teach,' said Courtney, 'but in two hundred years they never attempted even to make a contact. I think that they were so far ahead of us that we were merely as ants to them.'

Van Noon sat up painfully and looked around. 'By the way, what happened to Jacko?'

'He's a little bruised and dazed, but nothing serious. Apparently the implosive blast shot him out of the pipe like a cork out of a bottle. He swears you did it on purpose.'

'I saw them go,' said Van Noon, 'and they were like golden gods flying back to Olympus. I would never have done a thing like that on purpose. Do you suppose we'll ever know why they were here?'

'I doubt it,' said Courtney. 'And even if they'd tried to tell us, I doubt our capacity to have understood. Try explaining the uses and construction of a Dewar flask to an ant—and see who gets tired first.'

