

Part 4 Time

New Dimensions

Time - Precognition - Ghosts - Exobiology

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SUPERNATURE: A Natural History of the Supernatural

By Lyall Watson

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SUPERNATURE

A natural history of the supernatural



Lyall Watson

Part Four - Time

'If only I had known, I should have become a watchmaker.'

Albert Einstein, in *New Statesman*, 16 April 1965.

Time is a rhythm. It comes and goes like the crackle of electricity in the brain or the gush of blood through the heart or the flood of the tide up the beach. All these things are governed by cosmic clocks, and our measurements are nothing but bookkeeping conveniences. Seconds and minutes have nothing to do with nature. Every organism interprets the universal rhythms in its own way. A cattle tic may sit on the end of a twig for months waiting for a passing mammal; a larval cicada lives for years in the ground at the base of a tree waiting for conditions that will be exactly right for its one day of life as an adult. For them these periods pass as a single moment, of no more consequence in their lives than the interval between two of our heartbeats.

Manipulations of time can give us some idea of how little we understand these differences. A time-lapse film of bean shoots growing in the dark, with one frame exposed each hour, shows a scene of unbridled ferocity as each of the plants thrashes and claws at its neighbors in an attempt to get to the light. Slow-motion films of moths in flight show them picking up the sonar signal of an approaching bat, calculating its strength and source, and taking the appropriate avoiding action, all in the space of one tenth of a second. Each species lives in its own way and its own time, seeing only one section of the environment through the narrow slit of its own sense system. Real space and time exist outside of individual awareness.

In this section I want to relate some of the phenomena in our experience to the flow of time and to put the evolution of nature and Supernature into temporal perspective.

9 - New Dimensions

Three hundred years ago scientists thought they knew what weight was, that it had some fixed and absolute meaning. Then Isaac Newton showed that things weigh less on the top of a mountain and that weight is affected by gravity. Today any child who has seen an astronaut waltzing ponderously on the moon knows that despite all his equipment the man weighs less there than he does on earth. After Newton, science turned to mass as its anchor, but then came Albert Einstein, who showed that mass is also variable; he demonstrated that the faster a thing moves, the more its mass increases. His findings prompted scientists to wonder: if speed is more important than mass, could time be used as a dependable basis of measurement?

The answer came, again, from Einstein. No, he said, time has no absolute meaning and will also be affected by gravity. He was right. When you travel very fast, time slows down, so the moon walkers have aged a fraction of a second less than we. But even those of us who stayed behind were not standing still; we are all moving rapidly through space and growing old less quickly than we would be if the earth were standing still. Everything is relative, and the basis of the theory of relativity is that space and time are inextricably tangled together.

Nothing is what it seems. We see two things happen and we say that one took place before the other; we can even measure the time interval between the two with one of our artificial timekeepers, but this may not be what took place at all. If the two events were sufficiently distant from us and from each other, information about them would come to us at different times. Someone watching from another vantage point might see them taking place simultaneously, and for a third person, in yet another position, the order of events could be completely reversed. So even when we are concerned with a single sense, based on the perception of visible light, the information carried by the medium can be distorted. The problem becomes even more complex when more than one sense is involved.

When watching a man chopping wood in the distance, we see the ax raised again before we hear the sound of its last impact with the log. If we knew nothing about the process or were ignorant of the relative speeds of sound and light, we might very easily assume that axes were instruments that made loud sounds when held up above the head. I feel sure that many of the apparently supernatural events in our experience are due to misinterpretation of this kind, and that at the root of all the problems lies the paradox of time.

Time

Time has very little to do with sundials, sandglasses, pendulum clocks, and spring watches. Even atoms of cesium in atomic timepieces are nothing more than devices for measuring time. Perhaps the best definition is, 'Time is a function of the occurrence of events.' (62) Between any two events that do not happen at the same time, there is a lapse, an interval, that can be measured. All the instruments of measurement are based on one assumption: implicit in their pinpointing the moment of 'now' is the notion that the rest of time may be divided into 'before' and 'after' this moment. Like the concepts of weight and mass, this one is now open to question.

The old distinction between space and time is based on the fact that space seems to be presented to us in one piece, whereas time comes to us bit by bit. The future seems to be hidden, the past is dimly visible through memory and its aids, and only the present is revealed directly. It is as though we sat in a railway carriage looking out sideways at the present as time flows by. But as it becomes possible to measure the passage of time in smaller units, it becomes increasingly difficult to decide just what the present is and when it starts and stops. No matter how fast the train is going, we can see at a single glance everything outlined by the window.

The fellow in the seat opposite us has his blind partly drawn and sees less. But at the same instant, someone in a carriage nearer the engine looks out his window and sees a slightly different view. While, riding illegally up on the roof, is someone else, whose vision is not at all restricted by the size of the carriage windows and, while looking out sideways in the same way as all the paying passengers, he sees a much wider field including the line a little way ahead. Which person is seeing the present? The answer seems to be that all are and that the differences in their views of it are imposed only by the limitations of their viewpoint. The rider on the roof is not looking into the future; he just has a better view of the present and is using his sense system more fully.

Hindu philosophy has always included the idea of an ever-moving present, and modern physics is now coming to accept this pattern. In the realms of subatomic mathematics it even considers the possibility

of the train traveling in the opposite direction, reversing the passage of time. Everything else in the universe is unidirectional; it becomes increasingly difficult to accept, and impossible to prove, that time should be the sole exception. Biologists have hardly begun to think about it. The notion of time as an arrow, as a long straight line, is a part of all evolutionary thinking. Palaeontologists draw charts to show the linear descent of the modern horse from a little marsh-living mini-horse with more than one digit on the end of every leg.

Geneticists trace more complex but still linear patterns of inheritance from generation to generation, all neatly numbered in sequence. Embryologists follow the development of a complex organism through every division from a single fertilised egg. Only ecologists and ethologists work with substantially different shapes, because they cannot help but notice that life is basically cyclical.

The freshwater eel *Anguilla anguilla* spends most of its life in the rivers of western Europe, but it is not born there. Young elvers suddenly appear in the coastal waters each year, and their origin was a complete mystery until Johann Schmidt made his classic study in the 1930s. (276) He compiled data on the size of eel larvae found at different places in the Atlantic and, plotting these on a map, traced their point of origin to a spot where the smallest ones most often occurred. This proved to be the Sargasso Sea, midway between the Caribbean and the bulge of equatorial Africa, three thousand miles from Europe. It seems that eels spawn at a great depth in these waters in the spring, and the tiny, transparent, leaflike larvae float up nearer to the surface in the summer.

They are wafted away by the North Equatorial Current and into the Gulf Stream, in which they spend three years slowly drifting toward Europe and growing until they are about three inches in length. As soon as they reach coastal waters, the leaf larvae undergo a remarkable transformation into little, pearly-white, cylindrical elvers that avoid salt water and invade the river estuaries. They make their way relentlessly inland, wriggling up waterfalls, slithering across meadows on rainy nights, and even climbing up to the mountain streams ten thousand feet high in the Alps. In chosen backwaters and pools they settle down to a quiet life that may last until the males are fourteen and the females over twenty years old. Then, suddenly they are struck by an urgent need to return to salt water; their whole hormonal system undergoes a tremendous change and they become fat and silvery, with mucus on their skin.

These powerful silver eels abandon their lakes and pools, often striking out over land in the dark, resting up in damp holes during the day, where they breathe through the water retained in their gill chambers until it is possible to continue their compulsive flight to the sea. When they reach the ocean, they disappear.

Schmidt assumed that they travel deep under water in a countercurrent, swimming in the dark for a year on their epic journey back to the spawning grounds in the Sargasso. But Denys Tucker has discovered that the moment the eels enter salt water, their anuses close up and they are therefore unable to feed and must live entirely on their internal stores of fat. (324) These resources are not enough for the vast effort needed to swim three thousand miles, so Tucker believes that they die without ever breeding. He calls the European eel 'only a useless waste product of the American eel', which was once assumed to be a different species, *Anguilla rostrata*, but could be just a variation of the same form produced by a different environment. Both American and European forms come from the Sargasso Sea as larvae, and it could be true that only the American adults are close enough to the

breeding grounds to be able to return and lay new eggs.

It has been suggested that the Sargasso Sea was once the site of an island sea on the lost continent of Atlantis and that the eels are simply trying to return to their ancestral breeding ground. It is certain that the eels are intent on breeding when they leave the European rivers; their gonads are fully developed, but no adult has yet been found in the deep Atlantic, and no eel marked in Europe has ever been recovered from the Sargasso Sea. A more likely explanation is that the journey was once much shorter, but the continents have drifted apart and the European adults are now just a 'waste product' and destined to die of exhaustion in their impossible attempt to return to the place where they hatched. There is no biological reason why they should not stop and breed somewhere closer, perhaps in the waters off the Azores, but the response to a situation that existed millions of years ago still persists and drives them to destruction.

We are seeing in the behavior of each generation of living eels the shadow of something that happened a long time ago. It is like looking out at a star that we can see exploding, knowing that it actually happened a billion years ago and that we are looking at something that long ago ceased to exist. We witness, in both eel and star, an event of the remote past taking place in our present. Space and time become inseparable, and when we cannot think of one without the other, time ceases to be the old, one-dimensional unit of classical physics, and the combination space-time becomes a new factor - the four-dimensional continuum.

The idea of a dimension that no one, not even the mathematician, has been able to imagine, let alone see, is difficult to grasp. It is uncomfortable to think of the here-and-now as the past, but it seems to be true. Space-time is a continuum, and it is impossible to draw distinctions between past and present and perhaps even future. In biological terms the fourth dimension represents continuity. A wheat seed that germinates after four thousand years in the tomb of an Egyptian pharaoh is no different from the other seeds in that husk that sprouted the year after they were first grown on the banks of the Nile. Bacteria normally divide every twenty minutes, but under unfavorable circumstances they can become resistant spores that are sometimes entombed in rock and wait for millions of years to be released and continue multiplying as though nothing had happened. Life conquers time by suspending it in a way that is almost as good as having a time machine. It may deal with space in the same way.

The busiest and most bizarre organisms in any drop of pond water are tiny, transparent, highly sculptured things with crowns or wheels of cilia that serve them equally well for both gathering food and gaining momentum. Seventeen hundred species have been described, and all are included in a distinct phylum of their own - the Rotifera, meaning the 'wheel-bearers' - but no two biologists can agree about where this group belongs on our evolutionary tree. Rotifers are so peculiar in almost every aspect of their structure and behavior, that suspicions are beginning to grow that they do not belong in our system at all. Geography means nothing to rotifers; similar pools of fresh water in Mongolia or Monrovia or Massachusetts all have the same species of rotifer in them. And changes in environmental conditions simply send them into a wrinkled, desiccated state that looks like a minute speck of dust, which can survive prolonged drying, freezing, or almost anything else that can happen. For instant rotifers, just add water.

These encapsulated specks have even been recovered from the air at fifty thousand feet, and there is

no reason why they should not be found at even greater heights, perhaps even propelled by freak atmospheric events out of the atmosphere and into orbit or on into space. In laboratory experiments dormant rotifers have survived in space vacuum conditions, and it has been suggested that they might leave earth in this way and wait indefinitely for other sources of water. It is even possible that they could have arrived here from somewhere else, extending the normal gap between generations from days to light-years, turning time into space and becoming part of the space-time system.

Space is everywhere all at once, and if the mathematics of space-time are correct, then time may have the same properties. In this view, time is not propagated like light waves but appears immediately everywhere and links everything. If it is indeed continuous, then any alteration in its properties anywhere will be instantly noticeable everywhere, phenomena such as telepathy or any other communication that seems to be independent of distance will be much easier to understand. At the principal observatory of the Soviet Academy of Sciences, Nikolai Kozyrev is doing experiments that seem to manipulate time.

Kozyrev is Russia's most respected astrophysicist, a man who predicted gas emissions on the moon ten years before the Americans discovered them. He has recently invented a complex assembly of precision gyroscopes, asymmetrical pendulums, and torsion balances that he uses to measure something he thinks may be time. In one, simple experiment he stretches a long elastic with a machine that consists of a fixed point, or effect, and a moving part, or cause. His instruments show that something is taking place in the vicinity of the elastic and that, whatever it is, it is greater at the effect end than at the cause end. This gradation is detectable even when the instruments are masked from all normal force fields and shielded by a wall one yard thick. Kozyrev believes that time itself is being altered and 'that time is thin around the cause and dense around the effect'. (233)

He is also intrigued by the fact that all life is basically asymmetrical. He has found that an organic substance made of molecules that turn to the left, such as turpentine, produces a stronger response on his equipment when placed near the stretched elastic, and that the presence of a right-handed molecule, such as sugar, produces a lesser response. In his view, our planet is a left-handed system and therefore adds energy to the galaxy. Kozyrev came to these conclusions following an intensive study of double stars, which, though separated from each other by considerable distances in space, gradually come to be very much alike. He found that resemblance in brightness, radius, and spectral type was so great that it could not be produced by the action of force fields alone. He compares the communion between two stars with the telepathic contact between two people and suggests, 'It is possible that all the processes in the material systems of the universe are the sources, feeding the general current of time, which in its turn can influence the material system.' (183)

Kozyrev is not alone in this mystic view of the energy of time. Charles Muses, one of the leading theoretical physicists in the United States, agrees that time may have its own pattern of energy. He says, 'We shall eventually see that time may be defined as the ultimate casual pattern of all energy release,' and he even predicts that the energy put out by time will be found to be oscillating. (220)

Cosmological theories seldom have any direct relevance for life here on earth, but this is one that could affect us profoundly. The idea that time affects matter is familiar to everyone who has ever seen a field in erosion or watched himself grow older, but the possibility that there might be a reciprocal action, in which matter affects time, is revolutionary. It means that nothing happens without effect and

that, whatever happens, all of us are touched by it, because we live in the continuum of space-time. John Donne said, 'any man's death diminishes me,' (89) and he could have been right not because he knew or cared about the man, but because he and the man were part of the same ecological system - part of Supernature.

Precognition

Every conditioned reflex is a sort of travel in time. When the bell rang, Pavlov's dogs salivated, because they were reliving the last time when the bell rang and it was followed immediately by food. Many animals learn to function in this way, because their lives are specialised and confined within limits where the one kind of stimulus is invariably followed by the other. The reflex has survival value for many species, but in man the picture changes. We are exploratory and constantly running into new situations, where old responses would be inappropriate. We are confronted with uncertainty and sometimes respond to it with superstitions based on similar experiences in which we came to no harm. Soldiers often jealously guard a certain item of clothing or equipment that is closely associated with past experience of escape from danger. But most often we respond to uncertainty with some pattern of behavior that seems to lessen the doubt by making the future known to us. We set up some system of prophecy or divination. These systems take many forms and, surprisingly, some of them work.

An American anthropologist with the magnificent name of Omar Khayyam Moore examined divination techniques used by the Indians in Labrador. These people are hunters, and failure to find food means hunger and possible death, so when meat is short they consult an oracle to determine in which direction they should hunt. They hold the shoulder bone of a caribou over hot coals, and the cracks and spots caused by the heat are then interpreted like a map. The directions indicated by this oracle are random, but the system continues to be used, because it works. Moore reasons that, if they did not use the bone oracle, the Indians would return to where they had last hunted with success or where cover was good or water plentiful.

This could lead to over-hunting of certain areas, but the use of the oracle means that their forays are randomised; the regular pattern is broken up, and they make a better and more balanced use of the land, which means in the end that they are more successful. Some kinds of magic work. The very fact that they continue to be used in communities whose existence depends on them shows that divination of this kind works often enough to have survival value. As Moore says, 'Some practices which have been classified as magic may well be directly efficacious as techniques for attaining the ends envisaged by their practitioners.' (216)

We survive by controlling our environment, and control is made possible by information. So lack of information quickly breeds insecurity and a situation in which any information is regarded as better than none. Even white rats seem to feel this way about it. An elegant experiment was set up in which the inevitable maze, leading to food in one of two boxes, was modified so that on one path the rat was provided with information about whether there would be food in the box at the end or not. (259) The chances of food being in either box were even, but after some days of training, all the rats developed a distinct preference for the side where they obtained advance information, even though the food rewards were no greater. Humans show the same sort of preference for knowledge about an uncertain but unavoidable outcome.

Time and again we show that, regardless of the nature of the news and in spite of the fact that we get no advantage from it other than learning what was going to happen in any case, we would prefer to know and thereby reduce our insecurity. This anxiety about the future can be so great that bad news is preferable to an absence of information; it may even come as a relief, because it frees us to adjust to a situation. (162) Studies on prisoners have shown that those with the possibility of parole are under considerably greater strain than those who are reconciled to the fact that they have a life sentence to serve. There can hardly be a maxim more inaccurate than the one that claims, 'No news is good news.'

And yet we do not demand a state of complete certainty. A good part of our success as a species is based on our ability to cope with environmental variation and our tendency to seek out new sources of stimulation. The popularity of risky pastimes such as mountaineering and motor racing is evidence of man's need for a certain amount of uncertainty and risk, a certain quantity of adrenalin in the system. But this can be too high, and in threatening situations anxiety is very intense and there is a strong desire for both information and some means of control. Any activity that involves some feeling of participation in the turn of events is welcome, and this need to know what is in store helps to account for the current tremendous popularity of do-it-yourself systems of divination and prophecy.

Precognition means 'knowing in advance', and systems of knowing cover just about every possible source of variation. They include aeromancy (divination by cloud shapes), alectryomancy (in which a bird is allowed to peck grains of corn from letters of the alphabet), apantomancy (chance meetings with animals), capnomancy (the patterns of smoke rising from a fire), causimomancy (the study of objects placed in the fire), cromniomancy (finding significance in onion sprouts), hippomancy (based on the stamping of horses), onychomancy (the patterns of fingernails in sunlight), phyllorhodomancy (consisting of the sounds made by slapping rose petals against the hand), and tiromancy (a system of divination involving cheese). None of these need be taken seriously, because the phenomena all involve events that can only be random and in no way reflect any kind of biological principle, though I must admit to a certain weakness for the charming system involving rose petals, which we owe to those magnificent ancient Greeks.

Some of the more complex systems of divination are not as easily dismissed. Certainly the most impressive is the Book of Changes, or I Ching. This began as a series of oracles written more than three thousand years ago, which has been expanded and annotated so that, complete with commentaries, it now constitutes a formidable body of material. But the value of the I Ching lies in its simplicity. It is basically a binary system built up on a series of simple alternatives. To form each of the traditional patterns, the person consulting the oracle divides a number of yarrow stalks or tosses coins to get what amounts to a yes or a no answer.

This is done six times in succession, so that the final result is a hexagram, or pattern composed of six horizontal lines, which are either intact or broken, according to the results of the draw. There are sixty-four possible combinations of the two types of line, and each of these hexagrams has a name and a traditional interpretation. In casting the stalks or the coins, the character of each line is determined on a majority basis, but if all the stalks or all the coins indicate the same choice, then this line in the hexagram is given special significance and opens the way for further possibilities of interpretation.

As with all methods of divination, a great deal depends on the person who interprets the results. In

most systems success is possible only due to the intuition and psychological awareness of the 'seer', who literally sees what people need or want to know by observing them very carefully. But the I Ching has a character of its own, a sort of inner consistency that almost defies description. Carl Jung noticed this and, I think, put his finger right on the answer. He was at that time interested in his idea of synchronicity and the theory of coincidences, and suspected that the unconscious might have something to do with the way the patterns came out. I feel certain that he was right and that the power of psychokinesis has a great deal to do with the weird accuracy of the I Ching.

All commentaries on the Book of Changes say something like, 'The more familiar one becomes with the personality of the I Ching, the more one understands what this wise gentle-stern friend is trying to say to you.' (327) And this is absolutely true. As soon as one becomes familiar with each of the hexagrams and comes to know that a solid line in a certain position has special significance, then the patterns begin to come out right and give the kind of advice one consciously or unconsciously expects to hear.

Colin Wilson describes this relationship well: 'We know, theoretically, that we possess a subconscious mind, yet as I sit here, in this room on a sunny morning, I am not in any way aware of it; I can't see it or feel it. It is like an arm upon which I have been lying in my sleep, and which has become completely dead and feelingless. The real purpose of works such as the I Ching ... is to restore circulation to these areas of the mind.' (342) Consulting the Book of Changes at a time of personal crisis amounts almost to a session with your favorite psychoanalyst. There is nothing in the fall of the coins or in the text of the book that is not already in you; all the I Ching does with its beautifully organised patterns is to draw the necessary information and decisions out and to absolve the conscious mind of the burden of responsibility for these decisions.

Symbols have a great appeal for the unconscious mind. It uses them to squeeze its ideas past the censor of the conscious in the I Ching, in dreams, and in the somewhat less benign system of divination that involves the tarot. (260) The tarot pack consists of seventy-eight cards, most of which are similar to ordinary playing cards, but twenty-two carry colorful symbols that were popular in the Middle Ages. There are emperors, popes, hermits, jugglers, fools, and devils - all characters with a high emotional content for someone who lived at that time. They still provide a sort of alphabet by means of which the 'seer' can work out his interpretation or the questioner can cross-examine his unconscious, but they lack the elegant precision of the I Ching. And it is more difficult to see how the unconscious can organise the order of the cards in a shuffle than it is to assume that mind offers something to the momentum of a falling coin. With its ominous symbols and its emphasis on violence, the tarot undoubtedly crashes into unconscious areas, but it looks like a coarse bludgeon in comparison to the subtle probe of the I Ching.

So even the most popular systems of divination are largely concerned with expanding present potential and seem to have very little to do with actually forecasting the future. Mechanical systems such as these are often manipulated by professionals on behalf of their clients, or they may be abandoned in favor of purely mental prophecies that are given with or without props such as crystal balls. But no matter how the divination takes place, the method of operation is the same. Symbols are used to open up the present or the past in such a way that one seems to get a glimpse of the future. A client is drawn into providing information about himself that ends up looking as though it came from the seer. No hypnosis need be involved, but the technique is very similar. The subject is induced to do

things to himself under the impression that someone else is responsible and must therefore be exercising supernatural powers. Even the best-known prophets show up in a poor light when stripped of these subjective impressions. Mental sleight of hand, usually practiced by ourselves on ourselves, conceals the limited success most performers really enjoy.

Oracular double talk is as old as Delphi. If anyone were really able to predict the future with any accuracy, he would need only a year or two to become absolute ruler of the world. I have looked as carefully as one can at the case histories of some of the world's most wealthy and influential people and can find there no evidence of supernatural abilities. They achieve their success through application and some luck, but all make mistakes, often very elementary ones, and none have taken gambles that were not based largely on experience. Full precognition seems to be non-existent, but there is some evidence that some people sometimes have access to snippets of information that cannot be explained in any other way.

William Cox, an American mathematician, has recently completed an interesting survey in an attempt to discover whether people really do avoid traveling on trains that were going to be involved in an accident. Cox collected information on the total number of people on each train at the time of the accident and compared these with the number of passengers who traveled on the same train during each of the preceding seven days and on the fourteenth, twenty-first and twenty-eighth day before the accident. (309) His results, which cover several years of operation with the same equipment at the same station, show that people did in fact avoid accident-bound trains. There were always fewer passengers in the damaged and derailed coaches than would have been expected for that train at that time. The difference between expected and actual number of passengers was so great that the odds against its occurring by chance were over a hundred to one.

It would be fascinating to make further investigations of this kind. So much of the material dealing with prophecy and prediction is anecdotal and impossible to analyse or view objectively, but statistical surveys could show that some of the other 'hunches' so popular in folklore are indeed mathematical realities and that there is some kind of collective awareness of things to come. Survival in a biological sense depends almost entirely on avoiding disaster by being able to see it coming. An antelope turns away from the water hole where a lion is lying in wait, because it catches a trace of smell on the wind or hears a bird making sounds that show it is disturbed.

An otter flees from its stream because a minute change in vibration warned it of an approaching flash flood. In assessing examples of apparent precognition, we need to be aware of life's receptivity to very subtle stimuli that tell us that the future has already started. They enable living organisms to anticipate the future by expanding the present. In the unconscious areas that respond to subliminal signals from the environment, the future already exists. We cannot change it; if we could, it wouldn't be the future, but we can alter the extent to which we will be involved in it. In a very real sense this is tampering with time, but it is made possible by entirely natural extensions of our normal senses, which give up a more than usually acute view of distant things.

In biological terms precognition therefore means knowing not what will happen but what could happen if ...

Ghosts

At the University of Colorado, Nicholas Seeds has taken mouse brains and teased them apart into their component cells. (303) These he put into a culture solution in a test tube and shook gently for several days. At the end of this time the separate cells reaggregated and formed pieces of brain in which cells were connected by normal synapses, showed the usual biochemical reactions, and grew a natural myelin protective sheath. Somehow cells are capable of recreating past patterns; they have a molecular memory which is passed on from one cell to another so that a new one can reproduce the behavior of its parents. If a change, or mutation, occurs, this, too, is faithfully duplicated by the descendants. The dead live again in defiance of time.

The cyclical patterns of life mean that matter is never destroyed but goes back into the system to re-emerge sometime later. Living organic matter rises again in the same form with the same behavior patterns in a process of reincarnation. Each new generation is a reincarnation of the species, but this does not mean that individuals reappear. The Greeks believed in metempsychosis - the transmigration of the soul into a new body - and similar ideas are so widespread among all cultures that they can be considered almost universal. But despite some sensational stories, there is little real evidence that anything of the sort occurs. It is difficult enough to prove that we have souls in the first place. While apparent knowledge of other times and places can be attributed to telepathic contact with someone still alive, it seems unnecessary to assume that the phenomena are produced by an eternal spirit.

Souls or spirits that occur without benefit of body are a separate kind of phenomenon, but can be considered in much the same way. For the sake of argument, it is worth considering the possibility that man can produce an 'astral projection', or part of himself that can exist without his normal physical body and perhaps even survive his death. These spirits are said to wander at will, and there are countless records of their having been seen, in whole or in part, in a great variety of situations. In England, one person in six believes in ghosts and one person in fourteen thinks that he has actually seen one. (123)

These are enormous numbers of people, and I have no intention of suggesting that they must all have been mistaken, but to me there is one very strange and significant thing in all their sightings. All the ghosts of which I have ever heard, wore clothes. While I am prepared in principle to concede the possible existence of an astral body, I cannot bring myself to believe in astral shoes and shirts and hats. The fact that people see ghosts as they or somebody else remembers them, fully dressed in period costume, seems to indicate that the visions are part of a mental rather than a supernatural process. In those cases in which several people see the same apparition, it could be broadcast telepathically by one of them. And where a similar ghost is seen by separate people on separate occasions, I assume that the mental picture is held by someone associated with the site.

George Owen, a Cambridge biologist who has done pioneer work in scientific parapsychology, says, 'The assumption of an actual astral body present in the vicinity of the percipient is, however, somewhat gratuitous and unnecessary if we are prepared to accept an explanation in terms of telepathy.' (238) As another biologist I say, 'Hear, hear!' The explanation of an unknown in terms of another phenomenon still in dispute might seem labored and torturous, but it is good science and better logic to settle for the more plausible of two explanations. Colin Wilson picked out another aspect of hauntings that fits his mental hypothesis. (342)

He suggests that the chief characteristic of ghosts appears to be a certain stupidity, 'since a tendency to hang around places they know in life would appear to be the spirit-world's equivalent of feeble-mindedness; ... one feels that they ought to have something better to do.' Wilson thinks that the state of mind of ghosts may be similar to that of someone with a high fever or delirium, someone unable to distinguish between reality and dreams. This description can apply equally well to the state of mind of someone seeing the ghost. Delirium is not necessary, but a certain amount of dissociation brought about by conflict between conscious and unconscious states, perhaps as a result of receiving a powerful telepathic communication, could be present.

Communications with the dead are similarly suspect. I cannot help wondering why, out of the billions who once walked the earth, it should always be Napoleon, Shakespeare, Tolstoy, Chopin, Cleopatra, Robert Browning, and Alexander the Great who just happen to be on hand when a spirit medium summons up someone from the past. Rhine sums up the problem by saying, 'The outcome of the scientific investigation of mediumship is best described as a draw.' (309) In seventy-five years of research no incontestable proof of survival has been found, but neither has it been possible to prove that some sort of survival after death could not occur.

The most interesting evidence ever gathered in this respect has been published recently by Konstantin Raudive, a Latvian psychologist now living in Germany. Raudive has discovered that tapes made by speaking directly into a microphone, by recording from a radio turned to random 'white noise' interference, or by connecting the recorder to a crystal diode set with a very short aerial, all include soft extraneous voices. The voices speak with a strange rhythm in many languages, sometimes so softly that it is necessary to amplify them by electronic means. Raudive says, 'The sentence construction obeys rules that differ radically from those of ordinary speech and, although the voices seem to speak in the same way as we do, the anatomy of their speech apparatus must be different from our own.' The strangest thing about these recorded voices is that they seem to respond to questions put by Raudive and his collaborators by producing more of their Esperanto-style comments that often look like direct answers.

In the past six years Raudive has recorded more than seventy thousand conversations of this kind. (263) The speech content of the recordings is exhaustively recounted and analysed in a book that includes testimonials from very well-known and reputable scientists who were either present when the tapes were made or who were able to examine the equipment involved. There can be no doubt about the reality of the sounds; they are on the tapes and can be broken down into phonemes and analysed by voice-print machinery, but their source is open to question. Raudive believes that man 'carries within himself the ability to contact his friends on earth when he has passed through the transition of death'. In other words he is certain that the voices are those of the dead, and he confidently identifies some of them as Goethe, Mayakovsky, Hitler, and his own mother. It is difficult to argue with this, because rigidly controlled experiments have been unable to account for the presence of the voices by any normal method.

On 24 March 1971 a test was made at the studios of a major recording company in England. Engineers used their own equipment and installed instruments to exclude freak pickups from radio stations and both high - and low-frequency transmitters. Raudive was not allowed to handle any of the equipment

at any time, and a separate, synchronised recording was made of every sound taking place in the studio. During the eighteen-minute recording, both tapes were monitored constantly and nothing untoward could be heard, but on playback it was discovered that there were more than two hundred voices on the experimental tape and that some were so clear that they could be heard by everyone present. (264)

I am struck by the similarity between this phenomenon and the thought pictures of Ted Serios. In both cases recording apparatus is picking up a signal that appears not to originate in the immediate environment, but both pictures and sounds are produced only in the presence of a particular person. The voices on Raudive's tapes speak only in the seven languages familiar to him. In neither case could the signals be detected or blocked by physical apparatus - Raudive has worked inside a Faraday cage - but the testimony of witnesses of the highest possible caliber makes it impossible to doubt that the results are obtained without conscious fraud.

Like the Raudive voices, the Serios pictures were at first attributed to spirit sources, but the connection between their content and the psychology of the man involved is in both cases too great to ignore. I think that both phenomena will be found to be produced in the same means and that it will originate in the mind of the living man and have nothing whatsoever to do with the dead.

It is possible that the voices have a perfectly normal physical explanation. We still know so little about things around us that it might not be long before we can build machines that will recapture the sights and sounds of the past. Film and recordings do just that, for our immediate past anyway. Now there is a suggestion that there could be similar records that we have just overlooked. A pot revolving on a wheel with a pointer just touching the clay could be a primitive sort of phonograph. All we need to do is rotate the pot again at the same speed, find the appropriate stylus, and we may be able to recapture the sounds being made in the pottery on the day the clay was thrown. Work already in progress on unvarnished pottery from the Middle East has produced some results that are encouraging.

Exobiology

In this look at other worlds around us, I cannot exclude the possibility that a part may be played by beings from other worlds altogether. Biology has lately given rise to a new discipline: exobiology, the study of extraterrestrial life. Ever since 1959, when analysis of a piece of meteor substance showed traces of organic compounds, a controversy has raged as to whether these compounds came into the atmosphere with the meteorite or whether they originate on earth. The dispute has never been satisfactorily resolved, and discussions about life elsewhere have had to continue to be based on inference and conjecture.

Astronomical calculations based on the fraction of stars with planets, the number of these planets suitable for life, the fraction of such suitable planets on which life actually appears, and the number of these on which life reaches consciousness and the desire to communicate - arrive at the conclusion that perhaps one in one hundred thousand stars has an advanced society in orbit around it. That means that there could be as many as a million intelligent life forms in our galaxy alone. But our success in establishing contact with any of them depends also on the longevity of each of us. It is possible that the acquisition of nuclear technology is a consequence that no species can control for long, and that all

the beings that do manage to get this far only succeed in destroying themselves with it rather quickly.

Assuming that they do not succumb, the chances seem to be quite high that sooner or later we will meet one or more of them. Erich von Daniken thinks that we are one of them. (333) He has collected a scrapbook of loose ends in archaeology and anthropology, such as the map found in Istanbul that shows the continents as they would look from space, distorted by the curvature of the globe; an iron pillar in India that does not rust; patterns on the plains of Peru that can be appreciated only from the air; descriptions in sacred manuscripts of gods coming down to earth in chariots with wheels of fire; and ancient paintings and etchings that portray figures wearing what look like space helmets.

From all this he deduces that God was an astronaut and that we are partly the product of an extraterrestrial intelligence. It is a provocative idea, but as a biologist with a belief in our own still largely unexploited ability, I find it unattractive and unnecessary to give credit for our achievements to some transient aliens.

Ivan Sanderson has the same idea, but expresses it in biological terms. He suggests that earth was seeded by an egg of life from somewhere else and that this eventually hatched and grew into a complex larva that embodies all life as we know it. He sees us as part of this larva, reaching the stage where we begin to think of metamorphosis and start spinning the web of intellect around us, encysting our minds in the cocoons of machines, the pupae, where they undergo essential changes and emerge eventually as adult forms to fly off to other worlds and start the whole process again by laying eggs there. The adult into which we will ultimately develop is, he suggests, nothing more than a flying saucer, or UFO. (293)

This bloodcurdling idea makes quite good biology; it could all be true. It is quite possible that the next step in our evolution is the development of an electronic intelligence and that the only way this could be produced from a lifeless planet was through the intermediate stages of organic life. The first generation of machine minds are already with us. They are based on printed circuits with electrons moving about through wires, and they depend on us. But the next step after that could be into pure energy fields, which would leave us and live either in space or in those parts of the universe where exploding stars and novae provide an active environment of the sort of intense radiation that this superelectronic mind would need to nourish it.

I hope that it is not true. I am impressed by our inefficiency, by our vast, as yet untapped potential, and by the progress we have already made using only one small corner of our minds. We are indeed larvae, eating our way through earth's resources in a mindless, caterpillar fashion, but I believe that the imago is already beginning to stir within. When the climate is right, it will break out not as some sort of supercomputer but as an organic being that will embody an of Supernature and look back on technology as a childhood toy.