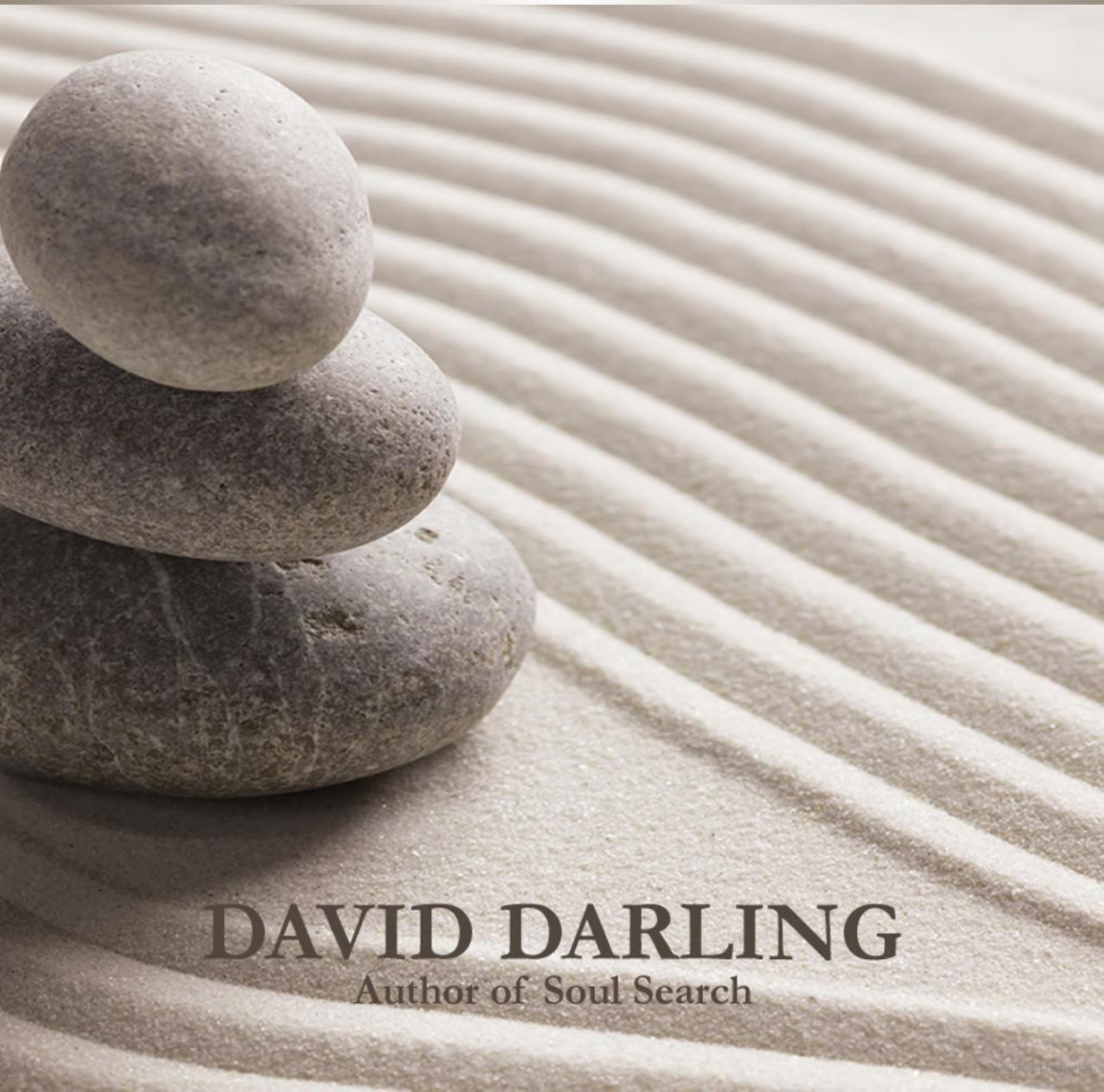
Zen Physics

The Science of Death, The Logic of Reincarnation



DAVID DARLING
Author of Soul Search

Zen Physics
The Science of Death, the Logic of Reincarnation

David Darling

Zen Physics
The Science of Death, the Logic of Reincarnation

ISBN 978-1622870-49-3

Published and Distributed by
First Edition Design Publishing, Inc.
August 2012
www.firsteditiondesignpublishing.com

Cover Design by Deborah E Gordon

Contents

Introduction

Truth sits on the lips of dying men.
– Matthew Arnold

It may happen in five minutes or in fifty years, but at some point you *will* die. There is no escaping it. And then what? Will it be the end? Is death a void, a nothingness that goes on forever? Or is it merely a phase transition – the start of a new kind of existence, beyond our old bodies and brains? This is the ultimate question a human being can ask: the question of his or her own destiny. Yet to most people it must seem frustratingly unyielding, an impenetrable problem to which only death itself will bring a solution. Try as we might, we seem never to come any nearer to understanding what our final fate will be. So we look around in every direction for guidance, but what we are asked to believe depends on whom we listen to. When we are young, we quiz our parents, teachers, and friends about what happens when we die, but for the most part we are treated to platitudes, folk tales, or embarrassed hesitations. Later, perhaps less bright-eyed and more pragmatic, we may simply give up asking, having reached the unsatisfying conclusion that no one from the pope on down really has a better insight into the problem of death than we do. The priest, the physicist, the mystic, the brain physiologist, the fellow standing next to us in the bar – all may have something worthwhile to say, providing they are willing to break one of society's greatest taboos and talk freely about death. But their opinions are discouragingly diverse.

Still we cannot help wondering: Do we have a soul? Or are we nothing more than biological machines whose consciousness ends forever at the instant our organic works break down? If it turns out that there is nothing supernatural in the world – no spirits, no heaven, no God in the customary sense – does this also rule out the possibility of survival beyond the grave?

There are many profound, unresolved mysteries in the universe, but none that touches us so deeply and intimately as the mystery of death. It can be unnerving to realize that every breath we take may be our last, that we stand each moment on the brink of ... what? Everlasting life? Or eternal nonexistence?

The past two decades or so have seen a dramatic upsurge of popular interest in the possibility of an afterlife, similar to that around the turn of the nineteenth century when spiritualism created such a stir and was eagerly espoused by many as offering a possible portal on the world to come. Today's excitement stems mainly from numerous well-publicized stories of near-death experiences (NDEs). However, research into the phenomenon of NDEs, fascinating as it is, represents only one of many current lines of inquiry which can be used to deepen our understanding of what happens when we die. As I hope to show, enough is already known to begin a preliminary mapping of the terra incognita that lies on the other side of death – a mapping based not on faith or traveler's tales of worlds beyond (however valid these may be), but on direct logical and scientific inference.

Science has an outstanding track record. We have been able to apply it successfully to probing the origin of the universe, the composition of stars, the structure of atoms, the evolution of life, and a great range of other problems that might at one time have seemed well outside our scope. So there is no reason to suppose in advance that the problem of death should be scientifically intractable. On the contrary, we can start out with every hope of reasoning our way

to a deep understanding of the process, meaning, and consequences of death.

At the same time, in tackling an issue like this, we need to recognize that it has both important objective and subjective elements. And, in fact, it is questions such as "What does death *feel* like?" and "What will death mean for *me*?" that interest us most on a personal level. The future of each of us as individuals and the threat that death poses to our identity, our very being, is what fascinates us above all else. Therefore, it would be missing the point to approach death in a too rigidly objective or reductionist frame of mind. We need the analytical tools of the physicist, yes. Rationality has to prevail if we are to make any progress at all. But it must be rationality tempered by a tolerant, human-centered outlook that allows into its inquiry not merely quantitative data but also the sincerely reported feelings and experiences of people who have encountered situations that are relevant in the context of death. Such an approach is more characteristic of Eastern modes of thought. Hence, *Zen Physics*: *Zen* for the subjective, *Physics* for the objective. But there is another, deeper reason for this choice of name, which, it will emerge, relates to the underlying nature of self and consciousness. We need, I believe, a whole-brain approach during life to appreciate what losing our brain at the point of death implies.

* * *

When I first began thinking seriously about the problem of death, some fifteen years ago, I held no firm beliefs about such things as the soul or the afterlife. If pressed, I would have said it was most likely that death was simply the end of us. But I have been surprised and profoundly influenced by what I have found.

Two main conclusions will be presented, both of which are remarkable and both of which, were it not for the force of evidence supporting them, might seem entirely beyond belief. The first is that *a form of reincarnation is logically inescapable*. There must be life after death. And there must, moreover, be a continuity of consciousness, so that no sooner have you died in this life than you begin again in some other. The second and even more significant conclusion is that *far from giving rise to consciousness, the brain actually restricts it*. Mind, it will become clear, is a fundamental and all-pervasive property of the universe.

Too often, science is seen as a potential destroyer of man's last hope of survival in a greater world. But this need not be so. Science after all simply means "knowledge." And you may find, as I have, that something akin to a spiritual – or at least a deep psychological – transformation can be achieved through logic and thought alone. Science, no less than mysticism and religion, offers a genuinely hopeful path to the future.

Part I: You and Other Stories

I am not afraid to die ... I just don't want to be there when it happens.
– Woody Allen

Chapter 1 – Our Greatest Fear

A wise man thinks of nothing less than death.
– Spinoza

Soon, very soon, thou wilt be ashes, or a skeleton ...
– Marcus Aurelius

When life is full and we are young, a bright world surrounds us, open to inquiry. Only in the far distance is there a speck of darkness, a missing point of the picture. But as we age, this speck grows larger. As our lives draw to a close, this region of darkness fills the ground before us like the opening of a forbidding cave. Others have entered that cave before us – billions of others, including our relatives and friends – and it is claimed even that some have returned from a brief sortie across its threshold during so-called near-death experiences (NDEs) or, less convincingly, as ghosts. Yet, despite what comfort we may choose to draw from accounts of NDEs, tales of spiritual manifestations, or the reassurances of various religions, most of us remain deeply uncertain, and afraid, as to what lies ahead. Death is the great question mark at the end of life, the mystery we long to solve but seem unable to. And yet it is an event, a transition, a portal, we must each go through sooner or later. It is a question that, in the end, holds an answer for every one of us.

Your death became a future fact at the moment a particular sperm cell from your father united with a particular ovum inside your mother. At that instant your personal hourglass was upturned and the sands of your life began to fall. Now no matter how hard you try to stay vigorous in body and mind, it will not affect the final outcome. No amount of progress to combat the effects of aging, through drugs, surgery, or other means, can do more than briefly postpone the inevitable. Your body is destined progressively to wear out and ultimately to fail. And then?

As soon as a person's heart stops beating, gravity takes hold. Within minutes a purple-red stain starts to appear on the lowermost parts of the body, where blood quickly settles. The skin and muscles sag, the body cools, and within two to six hours rigor mortis sets in. Beginning with a stiffening of the eyelids, the rigidity extends inexorably to all parts of the body and may last for between one and four days before the muscles finally relax.

Two or three days after death, a greenish discoloration of the skin on the right side of the lower abdomen above the cecum (the part of the large intestine nearest the surface) provides the first visible sign of decay. This gradually spreads over the whole abdomen and then on to the chest and upper thighs, the color being simply a result of sulfur-containing gases from the intestines reacting with hemoglobin liberated from the blood in the vessels of the abdominal wall. By the end of the first week, most of the body is tinged green, a green that steadily darkens and changes to purple and finally to black. Blood-colored blisters, two to three inches across, develop on the skin, the merest touch being sufficient to cause their top layer to slide off.

By the end of the second week the abdomen is bloated. The lungs rupture because of bacterial attack in the air passages, and the resulting release of gas pressure from within the body forces a blood-stained fluid from the nose and mouth – a startling effect that helped to spawn many a vampire legend among peasants who had witnessed exhumations in medieval Europe. The eyes bulge and the tongue swells to fill the mouth and protrude beyond the teeth. After three

to four weeks, the hair, nails, and teeth loosen, and the internal organs disintegrate before turning to liquid.

On average, it takes ten to twelve years for an unembalmed adult body buried six feet deep in ordinary soil without a coffin to be completely reduced to a skeleton. This period may shrink dramatically to between a few months and a year if the grave is shallow, since the body is then more accessible to maggots and worms. However, soil chemistry, humidity, and other ambient factors have a powerful effect on the rate of decomposition. Acid water and the almost complete absence of oxygen in peat, for instance, make it an outstanding preservative. From Danish peat bogs alone, more than 150 well-kept bodies up to five thousand years old have been recovered in the last two centuries. And likewise, astonishingly fresh after five millennia was "Otzi the Iceman," found in 1991, complete with skin tattoos and Bronze Age tool kit, trapped in a glacier in the Otztal Alps on the Austro-Italian border.

Accidental preservations aside, people throughout the ages have frequently gone to surprising lengths to ensure that their corpses remained in good shape. Most famously, the ancient Egyptians were obsessed by corporeal preservation, to the extent of mummifying not just themselves but also many kinds of animals which they held to be sacred. The underground labyrinths of Tuna-el-Gebel, for instance, are eerily crowded with the mummies of baboons and ibis. Incredibly, at least four million of the latter went through the elaborate embalming process – a process that made copious use of the dehydrating salt natron, excavated from around the Nile and parched desert lakes.

All mummies preserved by the old Egyptian method are very long dead – with one bizarre exception. In 1995, the Egyptologist and philosopher Robert Brier of Long Island University completed the first mummification in this traditional style in more than 2,000 years. His subject was a seventy-six-year-old American who had given his body to science. Brier went to great pains to follow the old methods, traveling to Egypt to harvest his natron (principally a mixture of sodium carbonate and bicarbonate) from the dry shores of Wadi Natrun, and using authentic replicas of embalming tools from the first millennium BC. Just as the mortician-priests of the pharaonic tombs would have done, Brier drew out the man's brain (The Egyptians discarded the brain because they drew no connection between it and the person's mind or soul. Mental life, they believed, was concentrated in the heart. To us this seems odd since it "feels" as if thought takes place inside our heads. If we concentrate hard for too long our headaches. Did the Egyptians experience "heartache" instead?) by way of the nostrils, extracted the major organs before storing them individually in canopic jars, and finally left the body for several weeks to completely dehydrate, swaddled and packed in the special salt. Only the subject's feet were visible, wrapped in blue surgical booties. Rejecting criticisms that his research was in poor taste, Brier claimed the experiment had shown beyond doubt that it is the action of natron, more than any other factor, that affords mummies their well-kept look.

The Romans, too, were familiar with the drying and preservative properties of certain chemicals. So-called plaster burials, in which lime or chalk (both drying agents) or gypsum (a natural antiseptic) was packed around the body in the coffin, have turned up in Roman cemeteries in Britain and North Africa.

More recently, wealthy Victorians went to enormous trouble to carefully dispose of their corpses. Burial in crypts and catacombs came into fashion – and not only because it gave the well-heeled, through the ostentatious grandeur of family vaults, a way to display their social standing. There were more sinister reasons to try to ensure a safe place for burial. Locked doors were a deterrent to body snatchers who might otherwise hawk your remains for illegal medical

dissection or, worse, pry out your teeth for use in making dentures. Also, the Victorians had an acute fear of being buried alive – better, they reasoned, to revive in a room with some chance of escape than in a horribly cramped coffin piled over with earth.

It is no coincidence that the average interval between death and burial in Britain lengthened from about five days in the late eighteenth century to eight days in the early nineteenth century. The object was to allow plenty of time for obvious signs of decay to develop, which would serve a dual purpose: to reassure relatives that their loved one was indeed dead and also to render the body less desirable to thieves.

People at this time often included in their wills bizarre requests concerning the disposal of their bodies. They would ask, for instance, that bells be attached to their corpse or that a razor be used to cut into the flesh of their foot to make absolutely sure they were not still alive before being interred. And in Imperial Russia perhaps the most wonderfully eccentric precaution of all was dreamed up to counter the possibility of premature burial. In 1897, having witnessed the remarkable revival of a young girl during her funeral, Count Karnice-Karnicki, chamberlain to the czar, patented his "life-signaling coffin." The slightest movement of the occupant's chest would trigger a spring-loaded ball, causing a box on the surface connected to the spring by a tube to open, thereby letting light and air into the coffin. The spring was also designed to release a flag on the surface, a bell that would ring for half an hour, and a lamp that would burn after sunset. Alas, history does not record if the count's ingenious invention ever left the drawing board.

Our choice of whether to be buried or not may be made on purely aesthetic grounds. We may be somewhat comforted by the idea of our bodies returning to nature as part of the grand recycling process. Alternatively, we may find the thought of being consumed by insects and bacteria too revolting to contemplate and, as a result, opt for a less organic mode of disposal. But, for some people, burial after death is important for religious reasons. Most obviously, according to Christian doctrine, there will be a resurrection of the dead on the Last Day of Judgment. The graves will be opened, say the scriptures, and saints and sinners will stand before the Son of God and be judged. Interpreted literally, this might suggest we should do our best to try to preserve whatever we can of our erstwhile selves so that there is at least something left of us to resurrect. And yet, in all honesty, it is hardly a realistic ambition. Whatever precautions we take to have our remains securely interred, nothing of our bodies – not even our bones – will survive the many millions of years that lie ahead in the Earth's future.

By contrast with burial, today's most common mode of disposal, cremation, annihilates a corpse at tremendous speed. In less than an hour, in a gas fire at temperatures of between 1100 and 1750 degrees Fahrenheit, the body reduces to just a few pounds of white ash, which can then be stored or dispersed according to whim – scattered over a favorite hillside perhaps, or, in the most exotic way imaginable, jettisoned into space from a rocket to boldly go where Gene Roddenberry, creator of *Star Trek*, has gone before.

Alternatively, organs of the body may be bequeathed so that they go on serving a useful function, other than as fertilizer, inside someone still alive. Yet another option was that chosen, in pretransplant days, by the British geneticist and writer J. B. S. Haldane:

> *When I am dead I propose to be dissected; in fact, a distinguished anatomist has already been promised my head should he survive me. I hope that I have been of some use to my fellows while alive, and I see no reason why I should not continue to be so when dead. I admit, however, that if funerals gave as much pleasure to the*

living in England as they do in Scotland I might change my mind.

Tragedy and dark comedy often seem to be companions in death. We take ourselves so seriously, invest such effort in our public image, work so hard at building a secure and comfortable niche for ourselves – and then what? All the pretense of modern life is stripped away and we end up desiccated, dissected, or decomposed.

Or do we? Our organic forms are obviously doomed. But are we more than just our living bodies and brains? Does some part of us – an inner essence, a soul or spirit – escape the dissolution of flesh?

Haldane put the case for the prosecution:

> *[S]hall I be there to attend my dissection or to haunt my next-of-kin if he or she forbids it? Indeed will anything of me but my body, other men's memory of me, and the results of my life, survive my death? Certainly I cannot deny the possibility; but at no period in my life has my personal survival seemed at all a likely contingency.*
>
> *If I die as most people die, I shall gradually lose my intellectual faculties, my senses will fail, and I shall become unconscious. And then I am asked to believe that I shall suddenly wake up to a vivid consciousness in hell, heaven, purgatory, or some other state of existence.*
>
> *Now, I have lost consciousness both from blows on the head, from fever, anesthetics, want of oxygen, and other causes; and therefore I know that my consciousness depends on the physical and chemical conditions of my brain, and that very small changes in the organ will modify or destroy it.*
>
> *But I am asked to believe that my mind will continue without a brain, or will be miraculously provided with a new one.*

The basic materialist view of death, now widely held by scientists and layfolk alike, seems, on the face of it, bleak beyond despair. "We" – our minds – appear to be nothing more than outgrowths of our living brains, so that inevitably we must expire at the moment our neural support structures collapse. Death, from this perspective, amounts to a total, permanent cessation of consciousness and feeling – the end of the individual. Considering how anxious most of us are at the thought of losing merely our jobs or possessions, it is hardly surprising that, in an increasingly secular society, the fear of death – of losing everything, including ourselves – has become so deep and widespread. Yet exactly what are we afraid of?

Epicurus pointed out the irrationality of fearing the end of consciousness in his *Letter to Menoeceus*:

> *Become accustomed to the belief that death is nothing to us. For all good and evil consists in sensation, but death is deprivation of sensation. And therefore a right understanding that death is nothing to us makes the mortality of life enjoyable, not because it takes away the craving for immortality. For there is nothing terrible in life for the man who has truly comprehended that there is nothing terrible in not living.*

Others have echoed this view, including Ludwig Wittgenstein: "We do not experience death," he insisted; "Our life has no end in just the way in which our visual field has no limit."

To use a mathematical analogy, just as an asymptotic curve comes closer and closer to a line but never actually touches it, so we move closer toward death throughout life but never actually reach death in experience (if by death we mean the end of an individual's consciousness).

Ironically, one of the possibilities we tend to dread the most – that death represents a one-way trip to oblivion – turns out to be something we need have no fear of at all. Socrates even enjoined us to look forward to it. In his *Apology* he explained:

> *Death is one of two things. Either it is an annihilation, and the dead have no consciousness of anything, or ... it is really a change – a migration of the soul from this place to another. Now if there is no consciousness but only a dreamless sleep, death must be a marvelous gain ... because the whole of time ... can be regarded as no more than a single night.*

We can put it even more dramatically than this. If death marks a permanent end of your consciousness, then *from your point of view* when you die, the entire future of the universe (running into tens of billions of years or more) must telescope down not just into a night, as Socrates described, but into a fleeting instant. Even if the universe were to go through other cycles of expansion and contraction, then all of these cycles as far as you are concerned would happen in zero time. What conceivable basis for fear could there be in such an absence of experience? We may as well be afraid of the gap between one thought and the next.

Marcus Aurelius was among those who offered another way to come to grips with the prospect of nonbeing: the period after death, he pointed out, is like the period before birth. You didn't spend the billions of years before you were born in a state of anxiety and apprehension, because there was no "you" to be aware of anything. Looking back now, it doesn't seem frightening that there was once a time when you were not conscious. Why then should you be concerned about returning to that nonexistent, nonconscious state when you die?

On a purely academic level, we can follow these arguments and appreciate the logic in them. And yet, for most of us, they ring hollow. They fail utterly to dispel the visceral dread we have of plunging into the terminal darkness, alone. The fear of death, *timor mortis*, the horror of the ultimate abyss that waits to claim us all, is far too deeply ingrained in our nature to be alleviated by mere rhetoric. Indeed, it is a fear whose origins go back to the very dawn of our planet.

On Earth, at least, life began as molecules of increasing complexity came together purely by chance in the primitive terrestrial ocean. In one scenario, a rich chemical broth activated by unshielded high-energy radiation from the sun and powerful lightning strikes gave rise to the first molecules that could make copies of themselves – the precursors of today's DNA. There is no mystery about this. Any assortment of objects, especially "sticky" objects like molecules, randomly stirred for long enough will give rise to every conceivable possible combination. Over millions and millions of years, the simple atomic and molecular units bumping into one another, under energetically favorable conditions, must have come together in all sorts of different ways. Most of these complicated associations would have been unstable. And even if they had been stable under normal conditions, a hard enough collision with some other particle or a well-aimed ultraviolet ray would have broken them apart. Eventually, however, a certain formation of molecular units combined to give a supermolecule that, by chance, could act as the template and docking station for making precise copies of itself. No sooner did this happen then the supermolecule spread rapidly throughout the waters of the young Earth. Possibly there were

several variants of such self-replicating substances which competed for resources. Not that there was any thought of competition at the time; there was as yet no substrate for thought at all. But in the chance emergence of self-copying molecules we can discern, from our future vantage point, the first stirrings of life, the beginnings of the struggle to survive in a potentially hostile world – and the origins of self.

Nature lays down no boundaries between life and nonlife. What we choose to call living is our own affair. Is an intricate self-replicating molecule alive? What if the molecule, through natural selection, acquires a kind of protective skin? The point at which we want to say that life has developed from nonlife is open to interpretation and debate since it is purely a human issue – a question of labels.

In reality, self-copying materials just became progressively more effective at surviving, more elaborate, and more capable through a process of blind, natural competition. Having internalized, as it were, their own blueprint, they became subject to random mutation. Struck by a penetrating photon from the sun or possibly a cosmic ray, a self-replicator risked its internal code being minutely altered. And, if this happened, then in the next generation an individual built according to a slightly different design would be created (providing the change had not altogether impaired the assembly mechanism). Most commonly such a mutant would prove less effective than its parent at staying in one piece long enough to have offspring of its own. But very occasionally a mutant would be born with an advantage over its parent and peers – the ability, for instance, to make copies of itself more rapidly, or to better resist attack from competitors.

In general terms, then, there is no problem in understanding how a variety of competing life-forms – primitive but steadily evolving toward greater sophistication – appeared on Earth long ago. None of these early creatures was anything more than a bundle of biochemicals wrapped up in a membrane bag. Even so, in their makeup and activity, we can recognize the inception of a new quality in the universe. These ancient gelatinous specks of matter showed the beginnings of self-interest and purpose. They had established barriers, definite, sustainable boundaries between themselves and the outside world. And although the heady heights of human intellect and introspection lay almost four billion years away, even the most elementary of life-forms harbored information at some level about what was part of their own constitution and what was not. They were, at least chemically, self-aware. Thus, the foundations for dualism – the belief in the separation of self and the rest of the world – were laid.

What we see from our biased viewpoint to be the most significant advance in evolution is the movement toward increased cerebration – the development of bigger, more elaborate brains and nervous systems. The ability of a creature to retain within itself a sophisticated representation of the world outside is held by us in high regard. But the greatest accolade of all we reserve for ourselves and the capacity we alone seem to have to be conscious of ourselves as free agents in a world amenable to our control.

Natural selection gives no vector of progress. There was never any master plan to build bigger, better brains. But with hindsight, it seems almost inevitable that once life had become established it would develop in the direction of increased self-awareness. To be aware of yourself is to have an effective knowledge of where you end and the rest of the universe begins, so you know precisely on which battle line to fight. And being an individual in the wild *is* a battle, a continual, desperate struggle to stay alive. Any number of events can destroy you. A terrifying array of predators are out there trying to make you their next meal. Or, if you are not sufficiently aware of what is going on around you, you may fall victim to some other unfortunate accident.

Or you may simply not find enough to eat. And no one is going to help you. On the contrary, your equally determined adversaries will take full advantage of any sign of weakness that you display. Given such perilous circumstances, the stronger your sense and skills of self-preservation, the better it is for you. Indeed, being and remaining an individual *necessitates* that you be uncompromisingly selfish.

We sometimes wonder how humans can be so cruel and ruthless, how they can lay waste to the planet with impunity, how they can exterminate other species and kill one another in alarming numbers. But such acts are not difficult after four billion years' practice. To stay alive at any cost, at anyone else's expense, is in our nature. It is the prime directive of our genes.

We are driven relentlessly to survive. And to aid us in this quest we have become equipped with the most remarkable survival organ in the known universe – the human brain. Such is the brain's power that it can construct and maintain a vivid sense of its own identity, its own unique selfhood. And yet it can also, with equal ease, cast its thoughts into the future and see its own inevitable demise.

Here, then, is the source of our greatest fear. We know full well that the brain and body will eventually break down. Yet such is our urge to carry on living that we cannot come to grips with the notion that the self presently associated with this doomed receptacle may similarly come to an abrupt end. The world and other selves will survive our personal death, we know. But this seems like small consolation if the particular selves that are you and I cannot, at least in some recognizable form, continue indefinitely.

Perhaps it was bound to happen that our race would go through this stage of uncertainty in its development. Maybe all creatures in the universe who become self-aware pass through a lengthy phase when they wrestle with the potentially devastating contradiction of a self-conscious survival machine that knows beyond all doubt that it *cannot* survive. But our combined intellect is formidable, capable of revealing deep, unexpected truths about the origin and nature of the cosmos. And there are no grounds a priori to suppose that it cannot also penetrate the more personal mysteries of the human self and mortality. Considering the importance of these issues to us, the time is surely ripe to embark upon such an investigation. And, providing we are prepared to take a broad-minded scientific approach, we can expect after millennia of doubt to shed real light on the problems of who we are and what happens to us when we die.

Chapter 2 – The Soul is Dead, Long Live the Self

And we, who are we anyway?
– Plotinus

Throughout history, people have countered the threat of death by believing in the existence of an immortal human spirit or soul. This soul, which is supposed to encapsulate all that is important about a person, is generally thought of as being like a pilot who, during life, works the controls of the body and brain. At death, as the physical body plunges to its doom, the ghostly pilot ejects in the nick of time (or is rescued by divine intervention) and hence survives to live on in some hereafter. Or so the hope goes. It is an attractive and comforting idea. And there is no doubt that most of us do need some notion of this sort to hold on to, if only to imbue our lives and the lives of our loved ones with more meaning.

It would be immensely reassuring, for instance, if a theory like that of the seventeenth-century French philosopher René Descartes were to be scientifically vindicated. Descartes believed strongly in the separate existence of the body and the soul. And he went so far as to identify the seat of the soul as the pineal gland, a neurological structure he chose because it was both centrally located and the only bit of the brain he could find that was not duplicated in the two cerebral hemispheres. The tiny pineal gland, in Descartes' view, served as the meeting place, or interface, between the material brain and the immaterial soul, which he equated with the mind or ego.

At first sight, it seems a reasonable enough conjecture (even though we might dispute the choice of the pineal). But the problems for any seat-of-the-soul hypothesis start as soon as we focus on the exact means by which the brain and the soul might interact. The brain is demonstrably built of ordinary matter, whereas the soul is presumed to consist of something else entirely – "mind stuff," or *res cogitans*, as Descartes called it. Crucially, the soul is held to be not merely tenuous, with an elusive nature similar to that of photons (light quanta) or neutrinos (capable of passing straight through the Earth without being absorbed), but actually *nonphysical*. In its very conception the soul stands outside the normal scheme of physics. And so, from the outset, we are at a loss to understand how it could possibly influence or be influenced by material objects, including the brain.

By the same token, the soul could not be expected to leave any trace on a detector or measuring device – a point, however, that has failed to deter some researchers. Sporadic efforts have been made over the past century or so to disclose the departure of the soul by weighing people shortly before and after death, but with negative results. The intriguing electric fields that surround living things and that can be visualized through the technique of Kirlian photography have also been posited, unconvincingly, as evidence for a spiritual life force. And, most recently, advanced scanning methods have been employed, notably by the American neurologist Richard Restak, to search the inner recesses of the brain for a soul in hiding, but to no avail. The fact is, the soul as it is normally presented is not a phenomenon open to scientific investigation. Nor is there any logic in claiming, on the one hand, that the soul is nonphysical or supernatural and, on the other, that it can have physical effects. Science will never be able to *dis*prove the existence of the soul, any more than it can disprove the existence of fairies or fire-breathing dragons. The gaps between what we know can always be filled with whatever people choose to dream up. But

any rational inquiry into death must start from the evidence at hand.

We also need to be cautious before jumping to conclusions about the soul when there is such a clear and powerful motive for us to *want* to believe in it. (The same argument applies to other marginal phenomena, such as ghosts, telepathy, and UFOs, all of which appeal to our need for a "higher" truth.) Potentially, the soul is a lifeline, a way of avoiding the terrifying finality of death. Imagine what a difference it would make to us psychologically if we knew, as certainly as we know we have a brain, that there is part of us that cannot die. We have a vested interest in the soul hypothesis being correct. And *this fact* alone is sufficient (whatever other elements may be involved) to account for the global, intercultural, long-standing belief in souls and an afterlife – a belief that has flourished in spite of a conspicuous lack of evidence.

Clearly, there is something very different between a lifeless corpse and a living, breathing, sentient person. But *what* is different? During life, is there an aspect of us that is above and beyond the mere workings of a biological machine? Or are we, after all, nothing more than a temporary aggregation of chemicals and cells?

We have a strong tendency to feel as if we are something extra beyond our bodies and brains – that we are, in effect, an intelligent life force dwelling within an organic shell. This makes it easy to go along with the suggestion of dualists such as Descartes, that the mind is not just an upshot of the functioning brain but, on the contrary, is a deeper and further fact. In the dualist's scheme, each of us has – or is – a "Cartesian ego" that inhabits the material brain. And from this position, in which the mind is held to be distinct from the living brain, it is a short (though not inevitable) step to the assertion that the mind is capable of an entirely independent existence, as a disembodied soul.

Dualism is simple and desirable to believe in. But then, from a child's point of view, so is the Easter Bunny. In time, we come to appreciate (often with regret) that an extremely large, beneficent rabbit is not essential to explaining the origin of a surfeit of concealed eggs at Easter. Similarly, most neurologists have now reached the conclusion that a Cartesian ego or self is not needed to account for the existence of the self.

It is a consensus fast approaching unanimity in scientific circles that "we" (our selves) are no more than the consequences of our brains at work. In the modern view, we are mere epiphenomena or, more charitably perhaps, culminations, of the greatest concentration of orchestrated molecular activity in the known cosmos. And although it is true we don't yet know exactly how the trick is done – these are still frontier days in the brain sciences – it is widely held to be only a matter of time before those who are teasing apart the circuitry of the human cortex lay bare the hidden props of the illusion. The situation is as brutally materialistic as that. There is not the slightest bit of credible evidence to suggest there is more to your self, to the feeling of being you, than a stunningly complex pattern of chemical and electrical activity among your neurons. No soul, no astral spirit, no ghost in the machine, no disembodied intelligence that can conveniently bail out when the brain finally crashes to its doom. If science is right, then you and I are just transitory mental states of our brains.

* * *

We think of ourselves as being definite people, unique individuals. But, at birth, within the constraints of our genetic makeup, *we are capable of becoming anyone*. For the first year or two of life outside the womb, our brains are in the most pliable, impressionable, and receptive state they will ever be in. At the neural level this is apparent in the fact that we are all born with massively overwired brains that contain many more embryonic intercellular links than any one individual ever needs. Such was the surprising finding of the first extensive electron microscope

study of human neural synapses (brain cell connections) by pediatric neurologist Peter Huttenlocher of Chicago's Pritzker Medical School in 1979. By staining and examining tissues from the frontal cortex, Huttenlocher found that the infant brain has, on average, about 50 percent more synaptic connections than has an adult brain, though the immature synapses are different in shape and much less well defined. It is as if a wide selection of the potentialities of the human race, acquired over millions of years, are made available to each of us at birth.

During the first twelve months of life, a remarkable 60 percent of a baby's energy intake goes toward fueling the development of its brain. In this critical period, huge numbers of embryonic connections between neurons are lost (through lack of use) while others are reinforced and developed (through repeated use). From being an incredibly sensitive, information absorbent, but otherwise useless lump of flesh, the brain rapidly acquires a highly patterned infrastructure that encodes a particular set of memories and beliefs about the world. Each brain loses the potential to become anyone, but gains, instead, the much more useful ability to conceive of itself as being a certain someone.

This transformation might seem almost magical if it weren't for the fact that we know, at least in general terms, how and why it comes about. A brain that was simply passive, naively experiencing its environment, reflecting everything but interpreting nothing, like a grinning Buddha, would quickly end up as a juicy morsel inside someone else's stomach. And so it would die, in blissful ignorance, before it could pass on its genes. And so there would be less grinning Buddhas in the future, but plenty more non-Buddha Buddha-eaters.

A real human brain starts out like a Buddha, all-receptive. But four billion years of ultrapragmatic live-and-let-die evolution have ensured that it immediately, under preprogrammed genetic control, gets down to the business of metamorphosing into a tough, practical survival machine. Its onboard genetic commands swiftly guide it in the process of condensing from a sort of gaseous state of total, nondiscriminating naivety to a sharp, crystalline state of effective self-centeredness with the wits and street savvy needed to stay alive.

Unfortunately, we are absolutely, pathetically helpless throughout the period that this momentous development takes place, which is why a lengthy, protective, nurturing environment is so essential to humans (and other brainy animals). Simpleminded creatures, like amoebae, ants, and even alligators, come into the world "knowing" as much about their self-boundaries as they will ever know, albeit this knowledge is based purely on dumb reflexes and instinct. But our self-knowledge is a much more elaborate affair. Survival in the *Homo* niche demands being able to experience the self as an *agent* in the world, as an individual with the power to plan and predict and decide among alternative courses of action. Such knowledge can only be garnered through individual experience, by watching and learning from others who are already proficient at being the most ruthlessly effective survival machines in the known universe – men and women.

A crucial part of the development of our self-image involves the brain latching onto the game rules by which the individuals around it play. During infancy, and continuing into childhood and adolescence, the brain organizes itself around the prevalent attitudes and beliefs to which it is exposed. But it goes beyond building a general sociocultural belief system; otherwise everyone within a given race or clan would turn out pretty much the same. The brain *personalizes* its belief system by consolidating numerous, often highly subtle impressions it picks up from others about its particular character, intelligence, and status; its bodily appearance, gender role, and capabilities. Whether these impressions, received from parents, siblings, friends, and other people who are most influential during childhood are, in any absolute sense, "right" or

"wrong" is not the issue. The brain will take them onboard whatever their merits, because they have come from the only authorities it recognizes and has access to. As these specific, private details are absorbed and assimilated, they begin to form the personal dimension of the brain's emerging worldview. Consequently, the brain starts to think of itself not just as being in a particular world, but as being a particular someone in that world – a person, an agent with powers of its own, with qualities, both good and bad, desirable and undesirable, by which it is uniquely distinguished from all others.

With the rudiments of a belief system in place, the brain starts to *interpret* and *evaluate* everything that comes to its attention in terms of this resident catechism of received wisdom. Every sensation and perception, every incident and event, every word, gesture, and action of other people, is construed within the context of how the brain understands the world and itself to be like. Thus the brain steadily becomes more and more dogmatic, opinionated, and biased in its thinking. It tends to hold on to – that is, to remember – experiences that comply with and support its acquired worldview, while at the same time it tends to reject or deny anything that seems incongruous with its system of beliefs. So, the emerging belief system is further strengthened and validated. And in this way the brain builds for itself an island of stability, a rock of predictability, in the midst of a vast ocean of potentially fatal chaos and inexplicable change.

We are inventions of our genes, our culture, our society, our particular upbringing, but oddly enough we're not aware of being so utterly contrived. We recognize that other people in other places and times may hold views different from our own. But we tend greatly to underestimate the extent to which we ourselves are caught up, constrained, and molded by the paradigms imposed upon us. Our indoctrination begins at such an early age and is so all-pervasive that the rules and theories we acquire become hard-wired into our brains. In particular, the power of our closest caretakers to shape us is awesome. Our parents or guardians reflect back at us, with approval, those sounds and actions we make as infants which are considered most desirable and appropriate in progressing toward the people they want us to become (just as they, too, were once similarly shaped). Subsequently, we fail to recognize that the beliefs about the world and about ourselves which we carry around with us like sacred relics are tentative, and possibly completely wrong. Instead we go through life fully convinced that they are true. We come to share and accept with unquestioning obedience the concepts of normality held by those around us, because these concepts are literally part of ourselves: we are their embodiment.

Our early environment and interpersonal relationships determine the precise neural circuitry of our brains, and this circuitry in turn determines who we are. Having encoded a particular model of reality, the brain, without "us" even realizing it, gives a spin to every sight, sound, smell, taste, and touch that enters through the senses. In fact, the conditioning begins even before the conscious brain goes into action. Evolution has furnished us with a range of sensory repression systems that save us from having to be aware of and thereby hopelessly overloaded and distracted by every minutia of our surroundings. So, just as the president has a team of minions to deal with all but the most crucial, relevant paperwork, the brain is able to deploy its attention, its executive power, where most needed by having the bulk of sensory input weeded out at a lower level.

Human vision, for instance, is an active process in which signals and perceptions are highly filtered, screened, and manipulated before they ever reach the higher centers of the cortex. We may feel as if we are directly and immediately aware of whatever images fall upon our retinas, but we are mistaken. Most of the handling of data from our eyes takes place at a subconscious level through a variety of largely independent specialized subsystems. And, strange

though it may seem, some of the visual subsystems in our brains produce an output that "we" cannot see. They contribute to brain function and even to our awareness of the world, but no amount of introspection can make us aware of the subsystems themselves. One of the ways this is made most strikingly clear is by the strange neurological condition known as blind sight. Following some kinds of injury to the visual cortex, people may become blind in one half of their visual field. But although they claim an inability to see anything in their blind half, they sometimes seem capable of absorbing information from that half. For example, if asked to point to a spot of light on a screen on their blind side they will say they cannot see it at all and that they are just guessing its position. Yet they are able to point to it correctly far more often than would be expected by chance alone. Many other investigations, too, over the years have shown that much of what is actually registered by our eyes and brain escapes our conscious attention.

Survival for our ancestors would have been impossible if every datum of sensory input had been allowed to gain access to the inner sanctum of consciousness. By various means, then, we are shielded from the endless flux, the seething, ceaseless commotion both outside and among our neurons, the *fact* that neither we nor the world are ever the same from one moment to the next. Only when the integration is complete, and the flux has been smoothed and transformed into stability, does a final, coherent picture appear in our awareness.

All human beings are subject to similar biological and genetic conditioning. A Pygmy's eye works in the same way as a Parisian's; a neurologist would be at a loss to distinguish between the brain of a Japanese and that of a Scot. But the impact of different societies and cultures upon the developing self is much more diverse. We tend to underestimate this impact and so assume that people have always held their individuality and mortality clearly in mind, as we Westerners do today. However, looking at the history of death, and of how death was dealt with by people in the past, gives some clues to a possible evolution of self-awareness even over the past few hundred years. This is not to say that our relatively recent ancestors had no concept at all of themselves as unique individuals; to believe that humans have not always been self-aware to some degree is radical in the extreme. (Just such a view is expressed by Julian Jaynes in his book *The Origin of Consciousness in the Bicameral Mind*. Jaynes, an American psychologist, has suggested that human self-awareness originated within the last two thousand years.) But it does seem as if there was a trend toward a more intensely focused awareness of self, especially during the early modern period.

In medieval Europe, society was rigidly structured. Everyone knew their place in the scheme of things – a scheme based on lineage, gender, and social class. There was virtually no chance of escaping one's birthright, whether as a peasant or a feudal lord, no scope for social mobility. To appreciate more readily the mentality of this time we have to recognize that our modern emphasis on the fundamental, overriding importance of the individual is not universal. Medieval attitudes lacked this emphasis, in large measure because of the overarching influence of the Church of Rome. The medieval faith in Catholicism was absolute. But what mattered in this faith was not the individual's role but the broad cosmic sweep of holy law and salvation. Personalities, individual differences and opinions, were considered irrelevant and undesirable in the face of such totalitarian religious belief. And this downplaying of the personal is reflected in the fact that medieval times produced virtually no autobiographies and very few biographies – and then only inaccurate, stereotypical lives of saints. In these writings, the psychology of the person makes no appearance; all that comes across is a cardboard cutout of a man or woman, an anodyne approximation to the Christian ideal, unashamedly embellished with archetypal miracle tales.

By the end of the Middle Ages, however, a change was evident. Instrumental in this was the rise of Protestantism, particularly in its most extreme form – Puritanism. John Calvin preached that some, "the Elect," were *predestined* to enter heaven, while most were doomed to spend eternity in hell. Absurd and intellectually offensive though this idea may appear now, it had the effect at the time of casting the individual into sharp relief, of differentiating between one person and another. And, in general, Protestantism of every kind argued for the private nature of religion. Catholics did not need, and were not expected, to face God alone. Priests, nuns, saints, the Virgin Mary, and all manner of rituals were on hand to intercede for the masses, so that the masses didn't have to think too hard or deeply for themselves, didn't have to become too involved as individuals or worry too much about the implications to themselves of the great issues of life, death, and redemption. Protestantism, by contrast, sought to diminish the gap between layperson and God, while Puritanism sought to close it completely. The Puritan faced God alone – in the privacy of the individual mind.

And there were soon to be other factors at work in the West, helping to turn the spotlight even more fully on each man and woman, forcing the self out of hiding. Not the least of these was the Industrial Revolution and, at its heart, that great engine, literally and figuratively, for change. Suddenly, the old agricultural lifestyle in which son did like father, and daughter like mother, generation after generation, and in which it was frowned upon and futile for the individual to act any differently from the rest, was swept away. And in its place was development (often for the worse for those who lived in the new slums) and technological progress, the rise of personal ambition, of the entrepreneur, the winner and loser, and a new emphasis on individuality and concern for one's own welfare. Suddenly, it was good and potentially profitable to be an individual, to go one's own way, to be different from the crowd. And that attitude has not altered to this day.

In the modern West, we revere the self, we set it up on a pedestal. There has never before been a culture, a time, in which people focused so obsessively on the well-being and elevation of their egos. And what do these egos turn out to be? Nothing, says science, but artifacts of the brain. We – our feelings of being someone in the world – survive as long as the brain lives. And when the brain dies ...

Our prospects look bleak. The very mode of inquiry that has helped shape the modern world and that we have come to rely upon so much informs us that, in effect, we are the dreams of carbon machines. There is no real substance to us, no deeper, further fact to being a person than just one feeling after another after another. Impressions, sensations, thoughts, emotions, continually well up into awareness and the sequence of these experiences, bound together by that fragile thing called memory, is projected by the brain as you and me.

Our choice of how to respond seems simple. We can despair or we can deny. We can throw up our hands and acknowledge that we are nothing more than illusions that will be exposed as such at the instant our brains die. Or we can reject the tenets of reductionist science and insist, based on faith alone, that some form of immortal soul *does* exist.

But there is a third option – one that appeals both to the intellect and to the heart. And this is to recognize that although, at one level, selves may not be as substantial as they normally appear, at another level they are real and important objects of inquiry. The very same situation applies to atoms, because modern physics has revealed beyond reasonable doubt that atoms consist almost entirely of empty space. And even the supposedly tangible nuggets of matter inside atoms – quarks (which make up protons and neutrons) and electrons – give no sign whatever of having any extension. Knowing this, it might seem incredible that, in large numbers,

atoms can give such a convincing impression of solidity. And yet, in the everyday world, solid they undeniably are. If you bang your head, it doesn't ease the pain to be lectured on the fundamental immateriality of matter. In the same way, it is totally unconvincing, in the light of what we experience every day of our lives, to be told that selves have no real existence. On one level, at least, they certainly *do* exist. And we are just as entitled to regard selves as entities in their own right as we are to credit an independent existence to anything, from germs to galaxies, that fundamentally is composed only of empty space and pointlike particles.

The soul – whether it exists or not – appears to lie outside the realm of scientific inquiry. But this is not true of the self. We can probe the self in many different ways and, as a result, hope to learn more about what it means to have a self – and to lose it.

Chapter 3 – Heads and Tales

There was a young man who said "Damn!
It is borne upon me that I am
An engine which moves
In predestinate grooves
I'm not even a bus, I'm a tram!
– anonymous

We would rightly regard someone who habitually spoke of himself as being a robot or a machine as being crazy. Yet this is precisely what science seems to be telling us about ourselves. The brain? An organic computer. Love? A process in those neurological systems that underpin mood. Anger? An activation of neural impulses in the amygdalahypothalamus structures. And self-consciousness as a whole? A fairly recent, emergent phenomenon of matter.

All of this may be true. We may, in one sense, be awesomely complex machines. But such a description fails to do proper justice to the human condition, because we are not only objects in the world but also *objectifiers* – and both aspects of our nature, the outer and the inner, need to be encompassed by any credible worldview.

Other people see you objectively, from a spectator's standpoint, as a living human being with certain unique characteristics. They observe a body and, most importantly, on that body, a head. On that head they see a face – a face that in the subtleties of its ever-changing expressions projects a certain persona to the world. The eyes, in particular, have been called "the windows of the soul." But this pretty description does not allow for the fact that the face may be, and generally is, a kind of mask (the Latin *persona* refers to the mask worn by actors in ancient theater: *per* = "through," *sonus* = "sound"; hence, literally, the sound that comes through the mask) hiding our genuine feelings. The outward face we present for the benefit of others (and so, indirectly, of ourselves) more often than not is a pretense, a concealment or misrepresentation, of the true state of the mind.

There is, then, this exterior view of you as a *dramatis persona* – an actor playing his or her part on the world's stage with the help of a convincing disguise. But there is also an interior view, to which you alone are privy. In mechanistic terms, as well as the appearance of the brain-body machine, there is the feeling of what it is like to be that machine – the subjective experience of being a certain someone. Consciousness, we might say, is the symmetry-breaking factor between the objective and the subjective.

To make this more clear, imagine that you are having your brain monitored by a superscanner. This scanner creates a detailed three-dimensional image highlighting the regions of the brain that are most active at any given time. Suddenly, a large screen in front of you, which had been dark, glows bright red. At the same instant, the scanner reveals a new region of activity in your brain – the physical correlate (presumably) of your perception of redness. Next, several other people have their brains scanned under exactly the same conditions. The result is a series of scans, including the one of your own brain, all of which are very similar. As far as you are concerned, the brain scans of the other people encapsulate all you can know of their reaction to the color red. In the language of physics, they represent complete "state descriptions" of your companions' brains. But when it comes to the scan of your own brain, it is patently obvious that

it falls well short of capturing everything about your experience of redness. For what it leaves out is nothing less than the conscious experience itself! A more precise definition of consciousness follows, then, as that property which makes a detailed state description of the observer's own brain seem incomplete when compared with equally detailed state descriptions of the brains of other people. Another way of saying this is that no form of symbolic communication, verbal, graphical, or mathematical, can convey the essence of what it is like to be someone. Fortunately, each of us, being human, is already intimately familiar with what it is like to be one person. And since there is no reason to suppose that there are any great differences between the subjective experiences of one person and those of any other, language is *in fact* a useful way of telling each other what we are feeling.

Still, you are you, and I am me. Alike we may be in many ways, but undeniably we have our differences. Indeed, to a large extent, we are *defined* by our differences. To be a self is to be different from anyone else and to know it. And to be different and to know it involves having a clear conception of where "you" end and the rest of reality begins – an awareness of one's boundaries.

At first sight, it may seem obvious that a person's boundary – their interface with the external world – is just the surface of their skin. As Sigmund Freud put it: "The I is first and foremost a bodily I." And it is certainly the simplest criterion of "I-ness" to apply. When we look at another human being, we have no trouble in deciding what is part of him or her and what is not. But the bodily I, by itself, is too simplistic a notion to capture all the possibilities of what we might consider ourselves to be. There is the question, for instance, of whether we *are* our bodies or whether we simply own them. The reductionist, the materialist, would claim the former, the Cartesian the latter.

In fact, the physical boundaries of self are nowhere near as fixed or well defined as we sometimes imagine them to be. If I lose an arm and have it replaced by a sophisticated prosthesis, does the artificial substitute become part of me or merely a new possession?

Today, implants, transplants, and prostheses can act as highly effective surrogates for so many bits of our original bodies that we are being forced to confront the issue of how much of a person can be replaced before a new individual is created. This dilemma will reach new proportions as partial transplants and prostheses for the brain become available. And in other ways, too, our physical bounds can appear to shift accordingly to circumstances. Normally mild-mannered and soft-spoken individuals, for instance, can at times seem to mutate alarmingly into aggressive, raving monsters when behind the wheel of a car, while skilled drivers and pilots often feel their vehicles to be seamless extensions of themselves. Has the link between man and machine become so close that we can sometimes regard the combination as being effectively like a new individual? And if so, what will be the consequences of even more intimate relationships between ourselves and our technology in the future as developments such as virtual reality take hold?

If you are nothing more than your body (or extended body), then is your corpse still you – or yours – after you die? Semantic problems obscure an easy answer. But more to the point, we are not really interested in our corpse, or the issue of its ownership, any more than we care about the fate of our hair once it has been cut off. What really matters to us is not what happens to our bodies when we die, but what happens to *us*. The implication is clear: we instinctively consider ourselves to be something more, or at least something very different, than just the material contents of our bodies and brains. We are the "what it is like to be" experience that our bodies and brains give rise to. And it is the long-term future of this "what-it-is-like-to-be-ness" that

concerns us above everything else.

William James wrote: "Each of us spontaneously considers that by 'I' he means something always the same." We know that our moods and attitudes alter from one day to the next. And we recognize, too, that great changes are associated with going through the various stages of life. Adolescence, in particular, is a time of dangerously rapid physical and psychological transformation – a time of enormous upheaval and insecurity. Yet, through it all, we believe that at root we remain one and the same person.

Two aspects of ourselves stand out as appearing to be of crucial importance. First, *personal identity*. You may not look or even think much like you did when you were five years old, yet in spite of this you believe that, in a deep, underlying sense, something about you – your identity – has remained uncompromised. This belief of yours is shared unquestioningly by the rest of society and has to some extent been cultivated in you by society's influence. How very different the world might be if this belief were not widely held. If people did not generally maintain that personal identity were an inviolable fact then it would bring into question, for instance, whether an individual could be held responsible for a crime that he or she was supposed to have committed some time ago. If a person could not be uniquely or conclusively identified with any past self, then that person could not be said to have existed at the time of a particular crime. By the same token, we would not be able to take credit for anything worthwhile we thought we had done, since the achievements would be considered by others to belong to someone else who was no longer alive. Conventions such as marriage, parental rights, nationality, and ownership or membership of any kind would lose their meaning.

The second aspect of ourselves we consider to be fundamentally important is *continuity*. Identity and continuity may be spoken of as different qualities, but clearly they are related. The former implies the latter. Your identity is rooted in the continuous existence of your body. You look more or less the same as you did last year. And last year you looked more or less the same as you did the year before that. The chronologically arranged photos in your family album testify to the smooth and steady development of your body and appearance from infancy to the present day. No one would seriously argue with this. And just as obviously there seems to be a continuity in your mental life because of the relationship between your awareness and your brain.

"A person," says philosopher Jonathan Glover, "is someone who can have I-thoughts." To be capable of I-thoughts seems to imply the existence of self-consciousness. And yet both are elusive concepts. You know that you have I-thoughts. You know you are self-conscious. But in others it is not obvious how to decide when self-consciousness shades into a less focused form of awareness and when this, in turn, merges into an almost unconscious state. With regard to nonhuman species, for instance, how can we judge if any other animals might qualify, in a limited or modified sense, as persons? Does the brain of a bonobo (a pygmy chimp, the creature most genetically similar to ourselves) or a dolphin integrate its experiences in a manner that enables something resembling I-thoughts to emerge? Or, are I-thoughts the exclusive privilege of life-forms that have evolved a language sophisticated enough to subtend a symbolic image of self? In considering such matters we need constantly to bear in mind that just because we have words such as "I," "self," and "person" in our vocabulary gives us no guarantee that they correspond to anything real outside of our cultural context. How we choose to define and interpret the terms we have invented is entirely up to us, and nature is not compelled to follow suit.

Most people would be happy to agree that a jellyfish is not a person in that it almost certainly can't think of itself as an "I." To say that it can't think at all would be going too far – a

jellyfish can process some kinds of information in ways that today's artificial intelligence researchers would be only too glad to be able to emulate in their machines. But a jellyfish cannot (as far as we know) generate thoughts such as "I'm happy," "I am being touched," or "I am stinging my lunch to death."

Children sometimes ask: "If you had to be a different kind of animal, what would it be?" Few people in their right minds (or rather, in their left minds – see chapter 6) would choose to be a jellyfish, or an ant, a worm, or a grasshopper. To be any of these, most of us might imagine, would probably be not much better or worse than being nonexistent. On a wish list of alternative life-forms, creatures with small brains or no brains at all would tend to come near the bottom, for the simple reason that we use mental prowess (gauged roughly by brain-to-body-size ratio) when differentiating between lower and primitive animals and those considered to be further up the evolutionary ladder. If you couldn't be human, the chances are you'd choose to be an ape, a cetacean, or a relatively smart domesticated animal such as a dog or a horse. You would naturally opt for a species that seemed to have a relatively secure, pleasant life, and that also had the wits to appreciate it – a species, in other words, that was as nearly human as could be arranged.

We sometimes wonder what it would be like to be a different kind of creature. Yet, in a sense, we already know, because we have effectively been different kinds of creatures during our own development. The growth of an individual human parallels, or recapitulates at a vastly accelerated rate, the general evolution of life on earth. We start out as a single-celled organism, like a bacterium or an amoeba. Then we progress through a simple, undifferentiated multicellular stage (a blastula) to become an embryo that, early on, is barely distinguishable from the embryos of many other animals, including reptiles and amphibians. For the first few weeks after conception we are truly a lower form of life ourselves, bathed in a warm amniotic sea. So, how *did* it feel to you? Can you recall? The problem seems to be that *you* were not really around at the time. And, consequently, it is difficult to imagine in what form any memories of this primal, pre-you phase of existence could be meaningful to or capable of being experienced by you now. By the same token, our brief spell as primitive creatures in the womb strongly suggests that lower life-forms have no well-developed conscious sense of self.

It seems that what we really mean by ourselves – the *feeling* of being an "I" – is not an all-or-nothing affair. In other species it may exist in a guise unfamiliar to us. In humans, it develops and changes over time. What we call self-awareness surely emerges as our minds construct an increasingly sophisticated symbolic representation of the outside world – an internalized portrayal of reality that, at some point during early childhood, comes to include our own bodies. Almost certainly, the same process took place during the evolution of mankind as a whole.

Much of what we believe about ourselves derives from how others relate and react to us. And, for this reason, total isolation from society can prove devastating. In 1988, a French woman, Veronique Le Guen, spent a record-breaking 111 days alone underground, 250 feet below the surface at Valat-Negre in southern France. Deprived of a clock, natural light, and any form of contact with others, Le Guen had only her diary for company. In one of the entries she described herself as being "psychologically completely out of phase, where I no longer know what my values are or what is my purpose in life." It was an experience from which she never properly recovered, and in January 1990, at the age of thirty-three, she committed suicide. Her husband said, "She had an emptiness inside her which she was unable to communicate."

Regular, close social interaction is vital to our self-definition, to bringing the fuzzy edges of our psychological bounds back into focus. (This is strangely analogous – and I wonder if it

may be more than that – to the situation in quantum mechanics [see chapter 10] where repeated observations of an atomic nucleus serve to prevent it from decaying.) We assimilate the responses of our fellow humans both to our appearance and our behavior. And this results in a feedback loop. Our appearance and behavior are subject to change according to the internal image we hold of ourselves. And any modifications in how we appear outwardly affect people's responses to us, which may result, again, in further alterations to our inner beliefs about ourselves. If people approve of how we look and act – if we conform to some positive, preconceived stereotype – then we will be praised and generally treated well, a response that will strengthen the already good self image we hold. On the other hand, if we deviate much from the norm and act disreputably, the feedback we receive will serve to confirm our worst fears that we are among society's outcasts.

Experiments have been carried out in which people's usual personas and roles are temporarily and drastically altered. In one of these studies, a group of college students was arbitrarily divided into two groups – prison warders and prisoners. The students were cut off from the outside world and encouraged to act their respective parts as realistically as possible. The warders pretended to treat their charges as potentially dangerous and untrustworthy criminals, while the latter feigned to look upon the uniformed officers as hated oppressors. After a short time, however, the students found themselves completely taken over by their roles; they were no longer acting. The warders genuinely regarded the inmates as being inferior and often behaved toward them in a brutal and domineering way. The prisoners, on the other hand, became cowed and actually afraid.

It is remarkable how much and how easily our self-image can be changed by outside influences. Dress one day in torn jeans and unironed shirt, your hair unkempt, your attitude careless; then the next day go out to the same places in your best attire, immaculately groomed, acting confidently and assured. The difference in how others will treat you is staggering (I speak from experience!). Moreover, this dramatic shift in the attitude of others will have a powerful influence on how you feel about yourself. You will feel, literally, like a different person.

Of course, most of the time we don't go out of our way to fabricate a new image of ourselves every day. We wear a uniform, in the broadest sense – a stable overall persona – because in this way we ensure that the reactions of others to us are reasonably predictable. And so the world is rendered less threatening and stressful. Our efforts at conforming to some particular role, whether it be as a rebel or as a stalwart of society, and the subsequent stabilizing of others' reactions to us, results in the creation of what seems to us, on the inside, a fairly well-defined, consistent self. We recognize "ourselves" more and more easily as we age; our life patterns become more and more predictable. But this is not to say that the self is ever *really* solid or secure. The self, the inner "I," remains no more than whatever feeling we are having at the present moment – a feeling shaped by the memories our brains have laid down of past experiences.

You and I are different not because different things are happening to us right now, but because, throughout our lives, our brains have acquired different narratives and ways of responding to the world. We are the products of our life stories. Your story is different than mine. But what is crucial in defining and distinguishing between us is not so much the differences between the actual events and surroundings that you and I have encountered, as it is the different way in which our brains have interpreted and remembered what has happened to us. An essential part of being human involves trying to make sense of the world, seeking and finding meaning (whether it is there or not). We have to do this from one moment to the next, every second of our

lives. So, inevitably, a lot of what we remember is not what *actually* happened – whatever this may mean – but rather a kind of myth or confabulation that helps us sustain the impression that we know what is going on. We tell ourselves white lies all the time to bridge the gaps in our understanding of an impossibly complex world. And not only do we fail to realize they are untruths (indeed this would undermine all our efforts) but we lay down these countless little fictions in our memories and subsequently treat them as if they were factual. We maintain a sense of continuity and so provide a basis for our feeling of personal identity at the cost of never knowing what is true. We are as much a myth as the stories we tell ourselves.

How then can we discover what is real – assuming there is such a thing? Stories we may be. The self, the "I," the ego, whatever we choose to name what we thought was our true essence, may be as insubstantial as a unicorn's fear of a dragon. But we cannot just leave it there. We do feel like someone, a being with inner depth. And we do want to know what it will feel like to die, and whether what follows death feels like anything at all.

Chapter 4 – Remember Me?

You have to begin to lose your memory, if only in bits and pieces, to realize that memory is what makes our lives.
– Luis Buñuel

Almost everything you do and think is based on what your brain remembers has happened to it in the past. And everything you do and think in the future will serve to reinforce the patterns of behavior and response associated with the particular person that you, and others, think of yourself as being. All new experiences and perceptions from one moment to the next are interpreted in the context of your apparently central, abiding self. Memory is your link with the past and your basis for action in the future.

To be a person, one must have a memory – a unique, accessible set of recollections – because to be a person means to hold one's life story and be actively, intimately involved with it. We must be able to see who we are now in terms of who we have been at different, successive stages along our journey from early childhood. We must hold the script to the inner drama that is ourselves, to know our own narrative. For if we cannot do this, we are without an identity or self.

Fortunately, our memories are remarkably durable. They survive despite the never-ending metabolic turnover of particles in every cell of our bodies, a fact lyrically captured by Loren Eisley in *The Immense Journey*:

> *I suppose that in the forty-five years of my existence, every atom, every molecule, that composes me has changed position or danced away and beyond to become part of other things. New molecules have come from the grass and the bodies of animals to be part of me a little while, yet in this spinning, light and airy as a midge swarm in a shaft of sunlight, my memories hold, and a loved face of twenty years is before me still.*

Atom for atom and cell for cell substitution poses no threat whatever to the self, as experience clearly shows. In the case of people who recover fully after having been in a coma for several months there has been an almost complete replacement of their constituent atoms in the period during which they were unconscious. Yet, upon waking, they have no sensation of being any different or of any time having passed.

A far more extreme case of the "persistence of self" was imagined by H. G. Wells in *The Sleeper Awakes*, in which a young man falls into a trance that lasts two centuries. As the trance begins, Wells asks: "Where was the man? Where is any man when insensibility takes hold of him?" And two hundred years later:

> *What a wonderfully complex thing! this simple seeming unity – the self! Who can trace its reintegration as morning after morning we awaken, the flux and confluence of its countless factors interweaving, rebuilding ... the growth and synthesis of the unconscious to the sub-conscious, the sub-conscious to the dawning consciousness, until at last we recognize ourselves again. And as it happens to most of us after the night's sleep, so it was with Graham at the end of his vast slumber.*