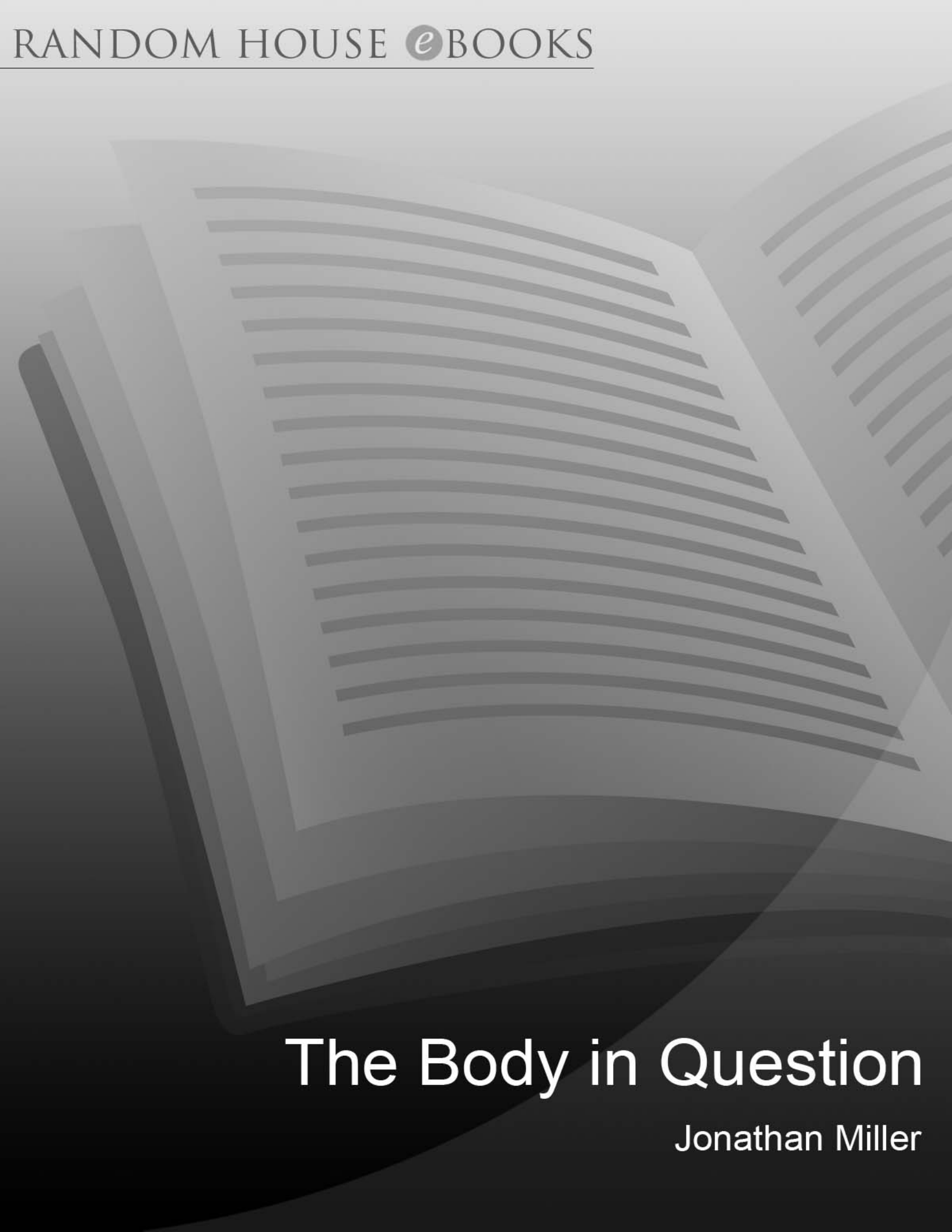


RANDOM HOUSE  BOOKS



The Body in Question

Jonathan Miller

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Acknowledgments

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About the Author

Jonathan Miller was born in London in 1934. He read Natural Sciences at Cambridge and qualified as a Doctor of Medicine in 1959. In 1961 he co-authored and appeared in *Beyond the Fringe* with Alan Bennett, Peter Cook and Dudley Moore. On his return to England in 1964, after the New York run of *Beyond the Fringe*, he was invited to edit and present *Monitor*, the weekly arts programme on BBC television. Since then he has made frequent and various contributions to public broadcasting. He produced and directed the TV film of *Alice in Wonderland* in 1966, and wrote and presented the thirteen-part documentary series *The Body in Question* in 1976. Between 1980 and 1982 he was the executive producer of the BBC's Shakespeare series. He conducted fifteen personal interviews with psychologists in a series entitled *States of Mind*, later published as a book. He has also written and presented a television series on language, and another on the history of mental illness.

He has worked extensively in the classical theatre, directing productions in Nottingham, Stratford, Chichester and at the Old Vic. For two years he was the artistic director of the Old Vic. His opera career started in 1974 and since then he has directed productions at most of the leading opera houses in the world, including the Royal Opera House in Covent Garden, the English National Opera, the Maggio Musicale in Florence, La Scala in Milan, the Metropolitan Opera in New York, the Deutsche Staatsoper in Berlin, the Bayerische Staatsoper in Munich and the Salzburg Festival. In 1998 he curated an exhibition at the National Gallery in London, entitled 'Mirror Image'.

His books include *McLuhan* in the Modern Masters series, *Darwin for Beginners*, *States of Mind*, *Subsequent*

Performances, On Reflection and a book of his own photographs, *Nowhere in Particular*.

In 1997 he was elected Fellow of the Royal College of Physicians in London and in 1998 he was admitted as a Fellow of the Royal College of Physicians in Edinburgh. He is also a Foreign Member of the American Academy of Arts and Sciences.

FOR RACHEL, TOM, WILLIAM AND KATE

THE BODY IN QUESTION

Jonathan Miller



PIMLICO

Introduction to the Pimlico Edition

Confronted by the somewhat alarming prospect of seeing this book re-published after more than twenty years, I was relieved to discover that it had dated less than I feared. The reason is that the scientific concepts which I chose to describe were ones that had already achieved a state of fundamental certainty by the time I was introduced to them as a medical student in the early 1950s, so that although subsequent research has unarguably amplified and enriched the details, the broad features of what Joseph Barcroft called 'the architecture of physiological function' are more or less as he described them in 1938.

Nevertheless, as I conceded in the Preface to the first edition, my account is undeniably incomplete and with the benefit of hindsight I now regret some of the omissions. For example, apart from the fact that the development of antibiotic resistance has revived the practical threat of infectious disease, the relationship between microbes and mankind is an interesting theoretical problem in its own right and it could have been usefully discussed in the wider context of predation, parasitism and symbiosis; all the more so, considering the widely accepted claim that some of the now essential features of the living cell are the descendents of once free-living organisms, which at some time in the distant past succeeded in establishing a mutually profitable relationship with their tolerant host.

The closely related topic of immunology is something else which might have been discussed, although the subject has been developing so rapidly that a large part of what I might have written would have been out of date by now. Even so, in a book, which bears this title, a mechanism which enables

the body to defend itself so efficiently against foreign invaders deserves more than a passing mention. Because apart from its therapeutic implications, the versatility of the immune system is yet another example of the body's ability to maintain its biological integrity without any conscious effort on the part of its owner. As it is, confronted by the autonomous efficiency of these systems, that is to say by their readiness to do the right thing at the right time without having to be prompted, human beings have had great difficulty in liberating themselves from the disabling belief that some form of Vital Force is involved.

The problem is that the notion of a Vital Force has inescapable connotations of intention or intelligence and this is something which requires an explanation, as opposed to being one. The same principle applies to the concept of Mind itself, from which, after all, the notion of biological intelligence is illicitly derived. Admittedly, by the beginning of the nineteenth century there were scientists prepared to concede that both Life and Mind had a physical basis, but when they brazenly invoked 'material organization' as an explanation, it was, as yet, little more than hand waving.

Today, all that has changed. In the once unbridgeable gap between the bare necessities of Matter and the enigmatic intentionality of Mind there is an elaborate construction site of mediating concepts whose existence lends weight to the claim that thoughtfulness itself is a bodily function, although naturally a more complicated one than, say, the cardiovascular system. In fact, the theoretical structures which now reach towards one another across the psycho-physical divide are developing so rapidly that it is tempting to believe that the distinctive terms which were once applied to mental life will soon be replaced by a different sort of language altogether. In some quarters this belief is already upheld as an article of faith; although, paradoxically, those who subscribe to it regard the concept of belief itself as questionable, along with most of the other mental terms

that figure in common parlance. Hence the disparaging phrase 'folk psychology'.

And yet, although it is now unquestionably true that subjective states of mind are implemented by objective states of brain, the inescapable fact that there is, as Thomas Nagel insisted, something 'it is like' to believe, hope and understand can't be explained *away*. In other words, even if, as some philosophers maintain, consciousness is an illusion, there is no getting away from the fact that the illusion is consciously *experienced*; and although we don't have to invoke anything other than brain, i.e. no magic that contravenes the laws of nature, I suspect, as some philosophers do, that we will never fully understand the connection.

This claim has been dismissed as frivolous obscurantism, foreclosing the possibility of further research and licensing the more regrettable forms of mysticism. It is, however, nothing of the sort. There is obviously much more to be asked and learned about the inseparable relationship between brain and mind and the fact that such research is destined to describe an asymptotic curve, which approaches but never reaches the limit of full understanding, doesn't preclude the necessity of our following it.

Jonathan Miller
February 2000

Preface

This book has arisen because I was commissioned by the BBC to do a thirteen-part television series on the history of medicine. At the outset I was daunted by the prospect of making a chronological trudge from Hippocrates to Christiaan Barnard, and I knew that my own energy and patience would have been exhausted by the time I had reached the sixteenth century. In any case, writing history in this way presupposes that medicine steadily groped its way towards enlightenment and efficiency, its progress punctuated by flashes of genius and cries of 'Eureka!'. When I recalled my own medical training, however, I realised that the principles I had been taught and the assumptions which were supposed to guide my practice had their origins in the comparatively recent past, and that it was almost impossible to trace back a direct line of thought much beyond the seventeenth century. From that date on, the descriptions of the body and its processes are at least comparable with our own, and although the insights of the scientific renaissance did not have important practical consequences until the beginning of this century, it is possible to identify and sympathise with these founding interests.

Even so, medicine did not make an effective contribution to human welfare until the middle of the twentieth century. The great leap forward is often attributed to a rapid increase in heroic procedures and the discovery of new drugs, but what distinguishes the medicine of the past twenty-five years is not that its practitioners are equipped with an arsenal of antibiotics and antiseptics, but that they are furnished with a comprehensive and unprecedented

understanding of what the healthy body is and how it survives and protects itself. We have today an impressive mastery of our illnesses precisely because we have a systematic insight into the processes which constitute health. This has been achieved by the accurate identification of the sort of thing our body is. And since finding out what something is is largely a matter of discovering what it is like, the most impressive contribution to the growth of intelligibility has been made by the application of suggestive metaphors.

In their efforts to manage and master the physical world, human beings have shown a remarkable capacity for inventing devices which lift, dig, hoist, wind, pump, press, filter and extract. With the use of furnaces, crucibles, ovens, hearths, retorts and stills, they have learned to transform the substances of the physical world into useful commodities. They have mechanised warfare and extended their powers of communication. The practical benefits of such ingenuity have been so impressive that it is easy to forget how much we have learned from the image of such mechanisms. While they have helped us to master the world, they have been just as helpful in giving us a way of thinking about it and about ourselves. It is impossible to imagine how anyone could have made sense of the heart before we knew what a pump was. Before the invention of automatic gun-turrets, there was no model to explain the finesse of voluntary muscular movement.

The immediate experience of the human body is something which we take for granted. We perceive and act with it and become fully aware of its presence only when it is injured, or when it goes wrong. Even then, the subjective experience of the body is usually incoherent and perplexing, and when we want it put right, we refer to people who have learnt to think about it with the help of technical metaphors: experts whose use of analogy has enabled them to visualise the body not merely as an intelligible system, but as an

organised system of systems – which does not mean that man is an engine or that his humanity is a delusion.

It is unfortunate that the establishment of medical effectiveness has coincided with a large-scale rejection of scientific thought and with the identification of science as all that is destructive and unnatural in the human imagination. In the belief that modern man has deviated from the ancient wisdom of natural communities, many patients have turned their backs on orthodox treatment, favouring practices which they regard as the expression of some cosmic unity – homeopathy, herbal medicine, acupuncture, and so on. The irony is that far from rejecting or distorting nature, scientific medicine achieves its results by recognising what nature is and by reproducing and reconstituting her grand designs. Science is not a blasphemy; the wilful rejection of its insights is. In this book I have tried to show that one of the most effective ways of restoring and preserving man's humanity is by acknowledging the extent to which he is a material mechanism.

This is not intended to be a complete survey of human physiology: several organs and systems are conspicuous by their absence. I have tried instead to illustrate and explain some of the fundamental principles which constitute the basic assumptions of modern physiological thought: principles such as feed-back, self-regulation and the constancy of the internal environment. I have also tried to show how life maintains, defends, repairs and renews itself in a universe where there is a natural tendency to return to a state of uniform inertia and disorder.

But the book is not simply about the organs it describes, nor is it all that can be said about them. In fact, to some extent I have put questions about the human body in order to ask further questions about the nature of human thought, especially about the difficulty man has had in setting aside the notion that his body is worked by conscious mental

processes. It is the story of the identification of the machine in the ghost.

J.M.

1

Natural Shocks

Of all the objects in the world, the human body has a peculiar status: it is not only possessed by the person who has it, it also possesses and constitutes him. Our body is quite different from all the other things we claim as our own. We can lose money, books and even houses and still remain recognisably ourselves, but it is hard to give any intelligible sense to the idea of a disembodied person. Although we speak of our bodies as premises that we live in, it is a special form of tenancy: our body is where we can always be contacted, but our continued presence in it is more than a radical form of being a stick-in-the-mud.

Our body is not, in short, something we have, it is a large part of what we actually are: it is by and through our bodies that we recognise our existence in the world, and it is only by being able to move in and act upon the world that we can distinguish it from ourselves. Without a body, it would be difficult to claim sensations and experiences as our own. Who or what would be having them, and where would they be happening? Without a body, it would be hard to make sense of the notions of effort and failure and, since the concept of powers and their limbs is built into the definition of personality, the absence of a physique through which these could readily be realised or frustrated would make it almost impossible to speak about the existence of a recognisable person.

The body is the medium of experience and the instrument of action. Through its actions we shape and organise our

experiences and distinguish our perceptions of the outside world from the sensations that arise within the body itself. Material objects are called into existence by the fact that we can walk around them, get different views of them and eventually arrive at the conclusion that they exist independently of our own experience of them.

We can, however, also perceive our body as if it were one object among others. We can gaze at it, touch it, grope many of its contours, as if it were another of the many items in the world's furniture. Each of us, then, has two images of the bodily self: one which is immediately felt as the source of sensation and the spring of action, and one which we see and sometimes touch. In growing up, in emerging from the 'blooming, buzzing chaos' of infancy, these two images blend with each other so that the body which we see becomes the visible manifestation of the one which we immediately feel. Nevertheless, a moment's introspection will show how different these two images actually are.

When you close your eyes and try to think of your own shape, what you imagine (or, rather, what you feel) is quite unlike what you see when you open your eyes and look in the mirror. The image you feel is much vaguer than the one you see. And if you lie still, it is quite hard to imagine yourself as having any particular size or shape. Once you move, once you feel the weight of your limbs and the natural resistance of the objects around you, the felt image of yourself starts to become clearer, almost as if it were called into being by the sensations you create by your own actions – like a brass rubbing.

The image you create for yourself has rather strange proportions: certain parts feel much larger than they look. If you poke your tongue into a hole in one of your teeth, the hole feels enormous; you are often startled by how small it looks when you inspect it in the mirror. The 'felt' self is rather like the so-called anamorphic pictures with which artists entertained themselves in the Renaissance. The most

famous example is the strange object hovering like a flying saucer in the foreground of Holbein's *The Ambassadors*: it is actually a splayed-out skull, which becomes immediately recognisable as such when viewed from the right angle. During the seventeenth century artists became very skilled at creating these transformations, which, if you place a cylindrical surface on the canvas, are at once restored to their normal proportions. So it is with the felt self and the visible self.

But although the felt image may not have the shape you see in the mirror, it is much more important. It is the image through which and in which you recognise your physical existence in the world. In spite of its strange proportions, it is all one piece, and since it has a consistent right and left and top and bottom, it allows you to locate new sensations as and when they occur. It also allows you to find your nose in the dark, scratch itches and point to a pain.

If the felt image is impaired for any reason – if it is halved or lost, as it often is after certain strokes which wipe out recognition of one entire side – these tasks become almost impossible. What is more, it becomes hard to make sense of one's own visual appearance. If one half of the felt image is wiped out or injured, the patient ceases to recognise the affected part of his body. He finds it hard to locate sensations on that side and, although he feels the examiner's touch, he locates it as being on the undamaged side. He also loses his ability to make voluntary movements on the affected side, even if the limb is not actually paralysed. If you throw him a pair of gloves and ask him to put them on, he will glove one hand and leave the other bare. And yet he had to use the left hand in order to glove the right. The fact that he could see the ungloved hand doesn't seem to help him, and there is no reason why it should: he can no longer reconcile what he sees with what he feels – that ungloved object lying on the left may look

like a hand but, since there is no felt image corresponding to it, why should he claim the unowned object as his?

Naturally he is puzzled by the fact that this orphan limb is attached to him, but the loss of the felt image overwhelms that objection, and he may resort to elaborate fictions in order to explain the anomaly, fictions which are even more pronounced if the limb is also paralysed. He may claim, for example, that the nurses have stuck someone else's arm on while he wasn't looking; he may be outraged by the presence of a foreign limb in his bed and ask to have it removed; he may insist that it belongs to the doctor, or that prankish medical students have introduced it from the dissecting-room; one patient insisted that his twin brother was attached to his back.

When one half of the body image is eclipsed in this way, the patient frequently has difficulty in acknowledging or making sense of the corresponding half of the outside world. He finds it difficult, for instance, to draw symmetrical objects such as daisies or clock faces, and tends to crowd all the petals or numerals on to one side. Such a patient may be able to tell the time between noon and six but be quite unable to read the hours between six and midnight. It is hard for him to find his way around the hospital, since he can appreciate turnings in only one direction and seems quite oblivious of the other. It is as if the world itself had suffered a partial eclipse.

An intact body image is an essential prerequisite for a full understanding of the shape of the world; which is not altogether surprising. The most inescapable experience we have is the sensation of our bodily self, and it is only in the course of growing up and acquiring skilled movements that we learn to tell the difference between the part of the world that is us and the part that is outside us. And just as the shrinking Roman Empire left Latin relics in the place-names of modern England – Manchester, Chester and Chichester – we leave linguistic remnants of our infant fantasy and label

the world as if it were a huge body: hills have feet and brows; clocks have faces and hands; chairs have arms and legs; the sky frowns and the bosom of the ocean heaves.

Very occasionally, a patient appears to lose not just half but the whole image of his felt self, and it is then impossible for him to identify any sensations as his own. Mrs Gradgrind's death in *Hard Times* is a wonderful example of this:

‘Have you a pain, mother?’

‘There’s a pain somewhere in the room, but
I cannot be certain that I have got it.’

Before you can recognise that a sensation is yours – before you can claim it and regard it as something that has happened to you rather than to the world at large – there has to be a felt self where it can be housed. Sensations happen in a rather strange part of the world, so strange that, strictly speaking, they don’t happen in the world as such – at least, not in the way that explosions happen – but in an isolated annexe called the self, and if that annexe is missing or halved the sensations float around in a sort of elsewhere. If you have a ring on your finger and your hand is resting on the table, it makes perfectly good sense to say that the ring is resting on the table too. But if you have a pain in your hand and your hand is resting on the table, it sounds very odd to say that the pain is on the table as well. Pains don’t happen in hands or heads or anywhere physical; they happen in the images of heads or hands, and if these images are missing the sensations are homeless. The reason we talk so glibly of having pains in our heads or in our hands is because under normal circumstances the subjective image of these parts coincides with their physical existence.

This situation can be reversed: the patient can lose a limb, and retain the image of it. Patients who lose legs and arms

as a result of surgery or accident often report the feeling of a 'phantom' limb. They know that the physical limb has vanished, and when they *look* they can see that it is no longer there. Nevertheless, they *feel* an image of it, and they may even have phantom pains in it. The phantom limb may seem to move – it may curl its toes, grip things, or feel its phantom nails sticking into its phantom palm. As time goes on, the phantom dwindles, but it does so in very peculiar ways. The arm part may go, leaving a maddening piece of hand wagging invisibly from the edge of the real shoulders; the hand may enlarge itself to engulf the rest of the limb.

These phantom limbs are a painful ordeal, and surgeons are often frustrated in their attempts to abolish them. It used to be thought that the sensation arose from the irritated ends of the wounded nerves, and surgeons used to cauterise these, generally to no avail. In fact, you can pursue the phantom to its source in the depths of the central nervous system, and still it persists. It is as if the brain has rehearsed the image of the limb so well that it insists on preserving the impression of something that is no longer there.

If the felt image of the physical self is in the nature of a fiction, an imaginary space which is usually occupied by the body of which it is supposed to be an imitation, where is this image housed? Where is the fiction created? If a surgeon opens the skull of a conscious patient and lightly stimulates the surface of the middle part of the parietal lobe, asking the patient to report what he feels, the patient will not mention or complain about sensations at the site of the stimulus. Instead, he will report strange tinglings in various parts of his limbs. As the needle is moved about, these sensations will alter their positions accordingly. By laboriously testing point after point, you find that the body is mapped on to the surface of the brain. It is the nervous

activity of this map that creates the three-dimensional phantom we have of ourselves.

The brain map is not drawn to scale. Certain parts of the body are represented over a much wider area of brain than others, and not necessarily in proportion to their size. The face, especially the mouth, is allocated much more room than the leg; the hand, and especially the thumb, seem to have more than their fair share of space. It is like an electoral map as opposed to a geographical one. Because of their functional importance, the hand and the mouth have more sense organs per square inch than the leg or the trunk, and, since all of the parts of the body are clamouring for attention, they have many more Members representing them in their Parliament; that is to say, in the brain. This is what accounts for the strange anamorphic appearance of the felt image. The image that we see in the mirror reproduces the anatomical proportions of the body, whereas the image we feel reproduces its Parliamentary proportions.

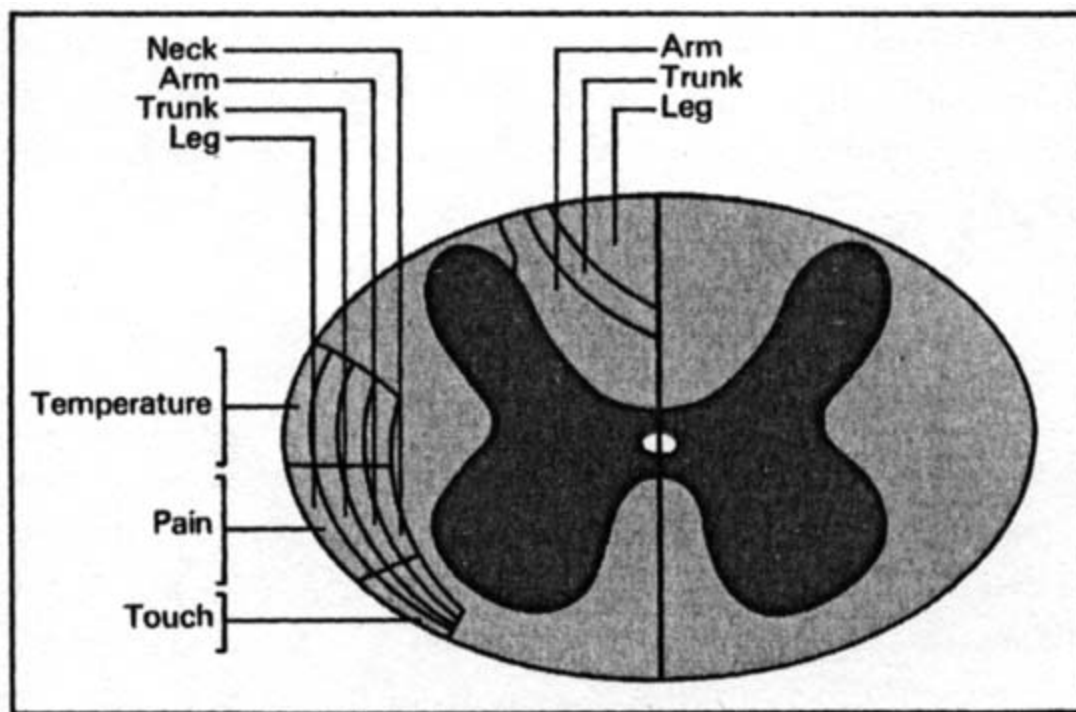


Penfield's famous 'homunculus', showing the proportional representation of bodily parts on the surface of the cerebral cortex.

The electoral map is not a *picture* of the body, it is a neurological *projection* of it; that is, it is not painted on the surface of the brain, but called into existence through the nervous connections it has with the part it represents. We feel pain in the appropriate part of our felt image because there is a line of nervous connections between the sense organs in the skin and muscles and the Parliamentary representative in the brain which answers for each. If you trace the nerve fibres leading from the skin, you find that they join up, forming larger and larger cables as you go from the hand towards the shoulder. These cables enter the spinal cord in an orderly series of entrances. They then turn upwards and, as they make their way towards the brain, they form great bundles which grow still more as they are joined by new ones entering at each level. Within these bundles, the nerve fibres preserve an anatomical pattern: nerves from the leg are grouped near the centre, with nerves from the arm, neck and face joining them on the outside. At the top of what is called the brain stem, the sensory fibres are all collected and squeeze together, rather like the separate beams of light passing through a projector lens. After going through a section of the brain called the internal capsule, they spread out again and project themselves on to the surface of the brain.

Certain important parts of the body – the heart, the liver, the kidneys – are conspicuous by their absence from the brain map. Although the map is three-dimensional, it appears to be hollow, with nothing inside: it is as if a large part of the working population had no Parliamentary representation. This is why we have no felt image of the heart or the liver. The conscious relationship we have to our internal organs is rather like the one which brain-damaged patients have to their limbs: we may know that we have a

heart, we have been told that we have a liver – but there is no felt image corresponding to them. Of course, patients with heart disease feel pain, and, as anyone who has had a kidney stone knows, you can get pains from the kidney; but we don't feel the pain *in* the heart or *in* the kidney, because there is no felt image in which to have such sensations. All such pains are referred: they are felt by proxy in a part for which there is already a felt image, and for each organ the proxy is always the same. The pain of coronary heart-disease, for example, is felt across the front of the chest, in the shoulders, arms and often in the neck and jaw. It is not felt where the heart is – slightly over to the left.



Cross-section of spinal cord, showing the orderly arrangement of sensory fibres ascending towards the brain.

The reason that other internal organs consistently choose the same Parliamentary proxy lies in the embryological origin of the organ in question and the fundamental architecture of the vertebrate body. Man and his vertebrate ancestors descended from a common stock and shared a

basic plan. If you look at the earthworm, you can see that it is pleated at regular intervals from head to tail. This is not a surface ornament. When you open the worm, you find that the animal is arranged in a longitudinal series of segments, in each of which certain organs are repeated with monotonous regularity. In each segment, for instance, there is a pair of kidney tubes and a paired nerve supply branching off right and left. This structure is laid out at an early stage in foetal development, and the pattern is repeated in all creatures which have descended from this line of ancestors.

In fish, the chevrons of muscle correspond to the serial segments of the earthworm, and if you open the spinal cord you can see that the segmental pattern is repeated in the orderly sequence of nerves. In the higher vertebrates, this arrangement has been extensively remodelled, and it is often hard to detect signs of it without making a very careful dissection. Segments coalesce and the component parts are often reshuffled to adapt the body to the life of the individual creature. For example, the wing of a bird and the forelimb of a horse are both derived from the same embryonic segments.

The nervous system, however, often preserves the ancestral pattern. Nerves exit from the spinal cord in an orderly ladder and, although these cables run together, divide and rejoin, it is still possible to map their segmental distribution among the skin and muscles. During the First World War clinical neurologists compiled an atlas of segmental territories by studying gunshot wounds in the spinal cord. By charting the loss of sensation which followed known injuries to certain nerve roots, they were able to draw up a territorial diagram which they discovered preserved the old segmental pattern of simpler vertebrates.

In man, the nerve segments which together form the neck and the arms are also the ones where the heart appears. The result is that the nerves bringing sensations from the

heart are in the same segment as the nerves which bring sensation from the neck and arm. This relationship is preserved despite the fact that in the course of foetal development the heart migrates to a position which is quite remote from its original site. It sinks down through the neck into the thorax and comes to rest on the diaphragm, whose muscles are also derived from the neck segments. But the heart maintains its ancient Parliamentary representation, despite its position in the body: the neck, arm, and upper chest continue to feel the pain for it. The same form of representation applies to all those parts which one would loosely call the 'innards'. The spleen, like the heart, develops from the same segments which give rise to the neck and upper arm; when someone injures this organ in a football accident he frequently feels the pain at the tip of the left shoulder. An ulcer on the back of the tongue may refer its pain to its old segmental partner in the ear. As a kidney stone travels down the ureter it refers its sensations one after another to its old segmental sites: the pain characteristically pursues a long spiral course from the loin, round the side, and down to the top of the penis. Such pains are archaeological reminiscences of what we once were.

Just as our normal experience of the body is divided into two provinces, so when something goes wrong the symptoms occur in one or the other. There are immediate, self-evident discomforts or disabilities, which one can have only by noticing them; and there are the changes which have to be observed either by sight or touch (though one can exhibit them without necessarily recognising them oneself).

The second group, which one might call findings or discoveries, includes all the possible changes in complexion – pallor, jaundice, blueness, rashes, spots, eruptions; all changes in size, shape and weight – general wasting, local swelling, enlargements and shrinkages; and changes in facial appearance, such as staring eyes or drooping eyelids.

These are in a sense the public features of illness: they are noticeable to everyone.

It is this conspicuousness that sets them apart from feelings or sensations which can be known only by the person who has them. Pain is a private experience, so is nausea, so are hunger and thirst. There are public *signs* of these states – groans, frowns, writhings, and so forth – but the actual pain and nausea and hunger and thirst are locked up in the unfortunate sufferer. The person with jaundice has only to exhibit it; someone with a pain has to announce it. Furthermore, having pain and knowing you have it are one and the same thing. If someone insisted he had a pain he couldn't feel, we would say that he had not learnt to speak English properly.

Sensations or feelings are also distinguished by the fact that there is no intelligible answer to the question 'What do you recognise them with?' You recognise swellings or rashes with your eyes, but you don't recognise pain with anything. It is obvious that a sense organ must be involved at some point in the proceedings. Why aren't we aware of this?

The answer is that the sense organs involved are very small and inconspicuous. The nerve endings which register these sensations are embroidered like millions of seed-pearls throughout the fabric of our body. With the help of a microscope you can find them in the skin, in the muscles and ligaments, in the walls of the blood vessels and in the membranes that line the abdominal cavity. If you link up their nerve fibres to an electronic recording device, you will see that they are constantly registering changes in their immediate environment, but they are much too small to be seen with the naked eye, and they are tucked away in inaccessible places.

This, however, is only part of the explanation. The fact that a sense organ is visible is much less important than the fact that we can control its performance, choosing and influencing the sensations we obtain. What makes us