

Individualism and the concept of Gaia

MARY MIDGLEY*

Introduction: why Gaian thinking is not a luxury

The idea of Gaia—of life on earth as a self-sustaining natural system—is not a gratuitous, semi-mystical fantasy. It is a really useful idea, a cure for distortions that spoil our current world-view. Its most obvious use is, of course, in suggesting practical solutions to environmental problems. But, more widely, it also attacks deeper tangles which now block our thinking. Some of these are puzzles about the reasons why the fate of our planet should concern us. We are bewildered by the thought that we might have a duty to something so clearly non-human. But more centrally, too, we are puzzled about how we should view ourselves. Current ways of thought still tend to trap us in the narrow, atomistic, seventeenth-century image of social life which grounds today's crude and arid individualism, though there are currently signs that we are beginning to move away from it. A more realistic view of the earth can give us a more realistic view of ourselves as its inhabitants.

What is the theory?

The current Gaian thinking that I believe can help here is a new scientific development of an old concept. The imaginative vision behind it—the idea of our planet as in some sense a single organism, is very old. Plato called the earth 'a single great living creature' and this is language that people in many cultures would find natural.¹ Our own culture, however, shut out this notion for a long time from serious thought. Orthodox Christian doctrine damned it as involving pagan nature-worship. And modern scientists, for their part, were for a long time so exclusively devoted to atomistic and reductive explanations that they too rejected this reference to a wider whole. Indeed, during much of the twentieth century the very word 'holistic' has served in some scientific circles simply as a term of abuse.

Recently, however, scientists have been becoming somewhat less wedded to this odd one-sided reductive ideology—less sure that nothing is really science except physics. The environmental crisis has helped this shift by making clear the indisputable importance of ecology, which always refers outwards from particulars to

* A fuller version of this article is forthcoming as a DEMOS pamphlet, and a still longer, rather different one will form the conclusion of my book *Science and Poetry*, to be published by Routledge. Both of these will appear in 2001.

¹ Plato, *Timaeus*, § 33.

larger wholes. In that changed context, solid scientific reasons have emerged for thinking that the notion of our biosphere as a self-maintaining system—analogue in some sense to individual organisms—is not just a useful idea but actually a scientifically necessary one. Science, after all, is not just an inert store of neutral facts. It always organizes them according to patterns which are drawn from ordinary thinking in the first place (where else, after all, could they come from?) and which often rebound in a changed form to affect that thinking profoundly in their turn. These strong pieces of imaginative equipment need to be understood and criticized in both their aspects. We shouldn't slide into accepting their apparent moral implications merely because they are presented as part of science.

The two-way influence of imagery is shown impressively by the powerful Machine Image which was central both to the Newtonian view of the cosmos and to the Enlightenment's notion of determinism. As Karl Popper put it, 'Physical determinism ... was a daydream of omniscience which seemed to become more real with every advance of physics until it became an apparently inescapable nightmare'.² The machine-imagery had taken charge of the thought. And another striking example today is the neo-Darwinist picture—still extremely influential, though its absurdities have been often noted—of evolution as essentially a simple projection of the money-market. Here the noisy rhetoric of selfishness, spite, exploitation, manipulation, investment, insurance and war-games easily persuades people that this new form of Victorian social-atomist ideology must be true because it has the support of science. By using a different imagery and a different basic pattern, Gaian thinking tends to correct this outdated bias. It does not reject the central scientific message of neo-Darwinism. It simply points out that it is not the whole story. Doing this is, indeed, one of its more obvious advantages.

Planetary considerations

I have been suggesting that this way of thinking has implications far beyond science. But the scientific case for it must, I think, be sketched first, however inadequately, so as to make clear what the term 'Gaia' actually means today.

The idea first arose out of considerations about the difference between the earth and its siblings. James Lovelock was employed by NASA in the early 1960s, designing sensitive instruments that would analyse the surfaces and atmospheres of other planets. But Lovelock was a chemist who had previously worked in biophysics and medicine, and it seemed to him that the experiments proposed for detecting life on other planets were too closely bound to expecting particular features similar to life on earth. A wider strategy occurred to him. Perhaps, he thought,

the most certain way to detect life on planets was to analyse their atmospheres ... life on a planet would be obliged to use the atmosphere and oceans as conveyors of raw materials and depositories for the products of its metabolism. This would change the chemical composition of the atmosphere so as to render it recognisably different from the atmosphere of a lifeless planet.³

² Karl Popper, 'Of Clouds And Clocks', in *Objective Knowledge: An Evolutionary Approach* (Oxford University Press, 1972), p. 222.

³ James Lovelock, *The Ages of Gaia* (Oxford University Press, 1988), p. 5.

He therefore compared the atmospheres of Mars and Venus with that of the earth and found indeed a startling difference. By this test Mars and Venus appeared, in a simple sense, static and dead. They had

atmospheres close to equilibrium, like exhaust gases, and both were dominated by the generally unreactive gas carbon dioxide. [By contrast] the earth, the only planet that we know to bear life, is in a deep state of disequilibrium ... Earth's atmosphere is like a dilute form of the energy-rich mixture that enters the intake manifold of a car before combustion; hydrocarbons and oxygen mixed. ... An awesome thought came to me. The earth's atmosphere was an extraordinary and unstable mixture of gases, yet I knew that it was constant in composition over long periods of time. *Could it be that life on earth not only made the atmosphere but also regulated it—keeping it at a constant composition and at a level favourable for organisms?*⁴

Checking what might follow from this, Lovelock found that there is indeed a whole range of mechanisms by which the presence of life seems, from its first appearance on the earth, to have deeply influenced the atmosphere in a way that made its own continuance possible when it otherwise would not have been.

The scale on which this happens is hard to grasp. I will mention here only one simple and dramatic element in it—the Carbon Cycle. The carbon which living things use to form their bodies mostly comes, directly or indirectly, from carbon dioxide—the somewhat inert gas which, on the other planets, acts as a full-stop to atmospheric reactions. Life is therefore always withdrawing this gas from the atmosphere and two statistics may convey something of the scale on which it does it. First, if you stand on the cliffs of Dover, you have beneath you *hundreds of metres of chalk*—tiny shells left by the creatures of an ancient ocean. These shells are made of calcium carbonate, using carbon that mostly came from the air via the weathering of rocks—the reaction of carbon dioxide with basaltic rock dissolved by rain.

This process of rock-weathering can itself take place without life. But when life is present—when organisms are working on the rock and the earth that surrounds it—it takes place one thousand times faster than it would on sterile rock.⁵ Coal and oil, similarly, are storehouses of carbon withdrawn from the air. All this carbon will go back into circulation one day, but meanwhile it is locked away, leaving the breathable air that we know, air that makes possible the manifold operations of life. Similar life-driven cycles can be traced for other essential elements such as oxygen, nitrogen, sulphur and that more familiar priceless thing, water.

There is also the matter of warmth. In the time that life has existed on earth, the sun has become 25 per cent hotter, yet the mean temperature at the earth's surface has always remained fairly constant. Unlike Venus, which simply went on heating up till it reached temperatures far above what makes life possible, the earth gradually consumed much of the blanket of greenhouse gas—mostly carbon dioxide—which had originally warmed it. Feedback from living organisms seems to have played a crucial part in this steadying process and to have ensured, too, that it did not go too far. In this way the atmosphere remained substantial enough to avoid the fate of Mars, whose water and gases largely streamed away very early, leaving it unprotected

⁴ Lovelock, *Gaia: The Practical Science of Planetary Medicine* (London, Gaia Books, 1991), pp. 21–2. Emphasis mine.

⁵ *Ibid.*, p. 111.

against the deadly cold of space. Here again, conditions on earth stabilized in a most remarkable way within the quite narrow range which made continued life possible.

Lastly, there is the soil. We think of the stuff we walk on as earth, the natural material of our planet, and so it is. But it was not there at the start. Mars and Venus and the Moon have nothing like it. On them there is only what is called *regolith*, naked broken stone and dust. By contrast our soil, as Lynn Margulis points out, is a museum of past life:

Soil is not unalive. It is a mixture of broken rock, pollen, fungal filaments, ciliate cysts, bacterial spores, nematodes and other microscopic animals and their parts. '*Nature*' Aristotle observed, '*proceeds little by little from things lifeless to animal life in such a way that it is impossible to determine the exact line of demarcation*'. *Independence is a political, not a scientific term.*⁶

In short, if all this is right, living things—including ourselves—and the planet that has produced them form a continuous system and act as such. Life, then, has not been just a casual passenger of the earth's development. It has always been and remains a crucial agent in determining its course.

Putting life together

I cannot discuss the scientific details further here. Orthodox scientists, though they were at first sceptical about it, now accept this general approach as one which can be used and debated within science.⁷ Their debates about these aspects of it will of course go on. But, as I have suggested, the importance of the concept is by no means confined to science. It concerns the general framework of our thought. It supplies an approach which, once fully grasped, makes a profound difference, not just to how we see the earth but to how we understand life and ourselves. The new scientific arguments bring back into focus the traditional imaginative vision of a living earth which I mentioned at the start—a vision which is already returning but needs to be made much clearer—and show how much we need it in our social and personal thinking.

As Lewis Thomas has pointed out, this vision already took on a new meaning for many of us when we first saw the pictures of earth sent back by the astronauts:

Viewed from the distance of the moon, the astonishing thing about the earth, catching the breath, is that it is alive. The photographs show the dry, pounded surface of the moon in the foreground, dead as an old bone. Aloft, floating free beneath the moist, gleaming membrane of bright blue sky, is the rising earth, the only exuberant thing in this part of the cosmos. If you could look long enough, you would see the swirling of the great drift of white cloud, covering and uncovering the half-hidden masses of land. If you had been looking a very long, geologic time, you could have seen the continents themselves in motion, drifting apart on their crustal plates, held aloft by the fire beneath. It has the organised, self-contained look of a live creature, full of information, marvellously skilled in handling the sun.⁸

⁶ Lynn Margulis and Dorion Sagan, *What is Life?* (London: Weidenfeld, 1995), p. 26. Emphasis mine.

⁷ For a review of recent discussions see Timothy M. Lenton, 'Gaia And Natural Selection', in *Nature*, 394, 30 July 1998.

⁸ Lewis Thomas, *The Lives Of A Cell* (London: Futura, 1976), p. 170.

No other planet, incidentally, has continental drift and there is some reason to think that the presence of living things may have contributed to making that mechanism possible by changing the composition of the crustal rocks. Again, it's a question of the carbon cycle. Early organisms may have deposited calcium carbonate on a scale that changed the composition of the ocean floor. As Lovelock explains, 'the formation of limestone deposits by organisms may have been important in triggering the change of composition of lithospheric rocks—a change that allowed plate formation and motion'.⁹

One aquarium, many windows

The scientific details that now articulate this picture of the living earth give it a new kind of standing because of the special importance that scientific thought has for us today. They make us bring our official scientific beliefs together with our imaginative life. That rapprochement is surely welcome. But it is not easy for us. Many dualisms in recent thought have urged us to keep these matters apart. We are used to hearing of a stark war between the two cultures and of a total separation between facts and values. In our universities, the Arts Block and the Science Block tend to be well separated. But we will never make much sense of life if we do not somehow keep our various faculties on speaking terms with one another.

Much of the difficulty about grasping the concept of Gaia is not scientific but comes from this fragmented general framework of our thought. It arises—for scientists as well as for the rest of us—from these artificial fences that we have raised across the scene and centrally from Descartes' original fence between mind and body. Our moral, psychological and political ideas have all been armed against holism. They are both too specialized and too atomistic. As many people are pointing out today, that slant is giving us trouble in plenty of other places as well as over Gaia. Yet we find it very hard to change it.

This difficulty in changing concepts is, of course, a common one. We are always in trouble when we are asked to think about the world in a new way. It is as if we had been looking into a vast, rather ill-lit aquarium through a single window and are suddenly told that things look different from the other side.

We cannot have a single comprehensive view of the whole aquarium—a single, all-purpose, philosophic Theory of Everything. Many prophets, from the seventeenth century to the nineteenth, from Leibniz to Hegel and Marx, have tried to give us such a view. But their efforts have proved misguided. The world is simply too rich for such reductive strait-jacketing. There is not—as Leibniz thought—a single underlying quasi-mathematical language into which the views from all aspects can be translated.

This does not mean that no understanding is possible. We can relate these various aspects rationally because they all occur within the framework of our lives. We can walk round and look at other windows and can discuss them with each other. But we cannot eliminate any of them. We have to combine a number of different ways of thinking—the views through several windows, historical, biological, mathematical,

⁹ Lovelock, *Gaia: The Practical Science of Planetary Medicine*, p. 131.

everyday and the rest—and somehow fit them together. When Galileo first expressed his views about the world, not only the Pope but the scientists of his day found them largely incomprehensible. Yet those ideas, when developed by Descartes, Newton, Laplace and the rest, shaped the set of windows through which the whole Enlightenment looked into the vast aquarium which is our world. That is the set through which many in our own age still want to see everything. This set is now called ‘modern’ by those who want to use that word as a term of abuse for past errors, contrasting it with various ‘postmodern’ sets which may be expected to replace it. Though I don’t myself find this vague time-snobbery very helpful, there is no doubt that the Cartesian vision needs radical revision.

The age of alienation

As many people have pointed out,¹⁰ the central trouble is the dualism of mind and body. The notion of our selves—our minds—as detached observers or colonists, separate from the physical world and therefore from each other, watching and exploiting a lifeless mechanism, has been with us since the dawn of modern science (and of the Industrial Revolution). Descartes taught us to think of matter essentially as our resource—a jumble of material blindly interacting. Animals and plants were machines and were provided for us to build into more machines.

It is this vision that still makes it so hard for us to take seriously the disasters that now infest our environment. Such a lifeless jumble would be no more capable of being injured than an avalanche would. Indeed, until quite lately our sages have repeatedly urged us to carry on a ‘war against Nature’.¹¹ We did not expect the earth to be vulnerable, capable of health or sickness, wholeness or injury. But it turns out that we were wrong; the earth is now unmistakably sick. The living processes (or, as we say, ‘mechanisms’) that have so far kept the system working are disturbed, as is shown, for instance, by the surge of extinctions.

Descartes’ world-view did, of course, produce many triumphs. But it produced them largely by dividing things—mind from body, reason from feeling, and the human race from the rest of the physical universe. It produced a huge harvest of local knowledge about many of the provinces. But it has made it very hard for people even to contemplate putting the parts together.

For a long time now our culture tolerated this deprivation. But it has become a serious nuisance in many areas of knowledge. The rise of systems theory and complexity theory are thriving attempts to break its restraints. Another such place is the lively debate now going on about problems of Consciousness—a topic once systematically tabooed by academics, but now agreed to constitute one of their most potentially interesting areas of study.¹² This change has been an intriguing showcase for the workings of intellectual fashion and it has interesting implications for discussions of Gaia. It is clear by now that many of us want to see our aquarium—our

¹⁰ See, for instance, Keith Devlin in *Goodbye Descartes: The End of Logic and the Search for a New Cosmology of the Mind* (New York, John Wiley & Sons, 1997) and the entire works of Richard Rorty.

¹¹ For examples, see John Passmore, *Man’s Responsibility For Nature* (London: Duckworth, 1974), ch. 1.

¹² There is now a thriving *Journal of Consciousness Studies*—something that would have been inconceivable twenty years ago.

world, including ourselves—more as a whole, indeed, that we desperately need to do this. To do so, we must attend to aspects of it which Enlightenment dualism cannot reach, aspects which simply do not appear at our traditional window.

Why ‘Gaia’?

One of these areas that has been made artificially difficult—the connection between scientific thought and the rest of life—comes out quaintly in the sharp debate about the implications of the name Gaia itself. That name arose when Lovelock told his friend, the novelist William Golding, that people found it hard to grasp his idea, and Golding promptly replied ‘Why don’t you call it Gaia?’ which is the name of the Greek earth-goddess, mother of gods and men. That name, when he used it, did indeed rouse much more interest in the theory. Many people who had not previously understood it now grasped it and thought it useful. Others, however, particularly in the scientific establishment, now rejected it so violently that they refused to attend to the details of it altogether.

In our culture at present, people find it somewhat surprising that an idea can be large enough to have both a scientific and a religious aspect. This is because, during the last century, our ideas of religion, of science and indeed of life have all become narrowed in a way that makes it difficult to get these topics into the same perspective. (Here our window has become a good deal narrower than it was when Galileo and Newton and Faraday used it. They never doubted that these things belonged together).¹³ To get round this difficulty, Lovelock used a different image. He launched the medical model of Gaia—the idea of the damaged earth as a patient for whom we humans are the only available doctor, even though (as he points out) we lack the long experience of other sick planets which a doctor attending such a case really ought to have. So he invented the name *geophysiology* to cover the skills needed by such a physician.¹⁴

This medical imagery at once made it much easier for scientists to accept the notion of Gaia. When the point is put in medical terms, they begin to find it plausible that the earth does indeed in some way function as an organic whole, that its climate and oceans work together with living things to maintain a normal balance, and that what gravely upsets any part of the system is liable to upset others. They can see that, for such a whole, the notion of health is really quite suitable. And of course they find the patient Gaia, lying in bed and politely awaiting their attention, much less threatening than that scandalous pagan goddess.

Gods, goddesses and scientific status

Lovelock, accordingly, came under great pressure to calm the scientists by withdrawing the goddess and for a while he seriously considered doing so. Eventually,

¹³ On the radical interdependence between their religious and scientific thinking see Margaret Wertheim, *Pythagoras’ Trousers, God, Physics and the Gender Wars* (London: Fourth Estate, 1997), chs. 5 and 6.

¹⁴ This is the topic of his book *Gaia, The Practical Science of Planetary Medicine*.

however, he decided that the whole idea had to be kept together because the complexity was real. As Fred Pearce put it in an impressive article in *New Scientist*:

Gaia as metaphor; Gaia as a catalyst for scientific enquiry; Gaia as literal truth; Gaia as Earth Goddess. Whoever she is, let's keep her. If science cannot find room for the grand vision, if Gaia dare not speak her name in Nature, then shame on science. To recant now would be a terrible thing, Jim. Don't do it.¹⁵

Lovelock didn't recant. He does indeed constantly emphasize the scientific status of the concept:

I am not thinking in an animistic way of a planet with sentience ... I often describe the planetary ecosystem, Gaia, as alive because it behaves like a living organism to the extent that temperature and chemical composition are actively kept constant in the face of perturbations ... I am well aware that the term itself is metaphorical and that the earth is not alive in the same way as you or me or even a bacterium.¹⁶

But he still writes, with equal firmness, 'For me, Gaia is a religious as well as a scientific concept, and in both spheres it is manageable ... God and Gaia, theology and science, even physics and biology are not separate but a single way of thought'.¹⁷

This raises the question; is religious talk actually incompatible with science? It is interesting to note that in one area of science—an area which is often viewed as the archetype of all science—such talk is readily accepted. That area is theoretical physics. As Margaret Wertheim has pointed out, most of the great physicists of the past, from Copernicus to Clerk Maxwell, insisted that their work was primarily and essentially religious. Most remarkably, too, their modern successors still make the claim:

In spite of the officially secular climate of modern science, physicists have continued to retain a quasi-religious attitude to their work. They have continued to comport themselves as a scientific priesthood, and to present themselves to the public in that light. To quote Einstein, 'A contemporary has said, not unjustly, that *in this materialistic age of ours the serious scientific workers are the only truly religious people*'.¹⁸

Einstein himself showed how sincerely he meant this by constantly referring to God in explaining his own reasoning ('God does not play dice ...'. 'The lord is subtle but not malicious' and so forth). And he explicitly said that this attitude was serious;

Science can only be created by those who are thoroughly imbued with the aspiration towards truth and understanding. The source of this feeling, however, springs from the sphere of religion.¹⁹

Later physicists have not dismissed this approach as a mere personal quirk of Einstein's. Instead, they have developed it in many best-selling books with titles such as *God And The New Physics*,²⁰ *The Mind Of God*,²¹ *The God Particle*,²² *The Physics*

¹⁵ Fred Pearce, 'Gaia, Gaia, Don't Go Away', in *New Scientist*, 28 May 1994.

¹⁶ Lovelock, *Gaia: The Practical Science of Planetary Medicine*, pp. 6, 11, 31.

¹⁷ Lovelock, *The Ages Of Gaia*, pp. 206 and 212.

¹⁸ Margaret Wertheim, *Pythagoras' Trousers* (London: Fourth Estate 1997), p. 12.

¹⁹ Einstein, 'Science and Religion', *Nature*, 146:65 (1940), p. 605.

²⁰ By Paul Davies (New York: Simon and Schuster, 1984).

²¹ By Paul Davies (New York: Simon and Schuster, 1992)

²² By Leon Lederman and Dick Teresi (Boston, MA: Houghton Mifflin, 1993).

of Immortality; Modern Cosmology, God and the Resurrection of the Dead,²³ and many more.

Is there perhaps some special reason why religious talk of this kind can count as a proper language for physics, but becomes inappropriate and scandalous when the chemical and biological concerns of Gaian thinking are in question? Or is it not so much the subject-matter as the sex of the deity that makes the scandal? Is it perhaps held to be scientifically proper to speak of a male power in the cosmos but not of a female one? There is a powerful tradition which might make this odd view look plausible. As Wertheim shows, throughout the history of physics, a strong and somewhat fantastic element of misogyny has indeed accompanied the sense of sacredness that always distinguished this study. The physical priesthood was a male one guarding a male god. It went to great lengths to protect its secrets from intruding females:

Walter Charleton, another founding member of the Royal Society, summed up many of his colleagues' antipathy towards women when he wrote, 'you are the true Hienas that allure us with the fairness of your skins ... You are the traitors to wisdom, the impediments to industry... the clogs to virtue and the goads that drive us all to Vice, Impiety and Ruin'. Henry Oldenburg, the Society's first secretary, declared that its express purpose was 'to raise a Masculine philosophy' ... This bastion of British science did not admit a woman as a full member until 1945.²⁴

This talk of a masculine philosophy echoes, of course, Francis Bacon's clarion-call for the new science to produce 'a Masculine birth of time' where men could turn their 'united forces against the nature of things, to storm and occupy her castle and strongholds'.²⁵

Of course the personifications in thinking of this kind should not be taken literally. Yet the reverent, awe-struck attitude that lies behind those personifications is surely a suitable one both for science and for our general relation to the cosmos. Einstein was not being silly. Anyone who tries to contemplate these vast questions without any sense of reverence for their vastness simply shows ignorance of what they entail. And of course, if the system of life itself is taken to have participated in the history of evolution in the sort of way that Gaian thinking suggests, then a substantial part of this reverence is surely due to that system. If it has indeed played a crucial part in stabilizing conditions on earth through billions of years to the point where we ourselves are now here and able to profit from them—if it has managed the remarkable feat of preserving the atmosphere and controlling the temperature, thus saving the earth from becoming a dead planet like Mars and Venus and turning it instead into the cherished blue-green sphere whose picture we all welcomed—if it has done all this for us, then the only possible response to that feat is surely wonder, awe and gratitude.

That sense of wonder and gratitude is clearly what the Greeks had in mind when they named the earth Gaia, the divine mother of gods and men. They never developed that naming into a full humanization. They never brought Gaia into the

²³ By Frank J. Tipler (New York: Doubleday, 1994).

²⁴ *Pythagoras' Trousers*, p. 100. For more about this amazing but highly influential sexual chauvinism see Brian Easlea, *Science And Sexual Oppression* (London: Weidenfeld and Nicolson, 1981).

²⁵ Farrington, *Philosophy of Francis Bacon*, pp. 62, 92, 93; Spedding, *Works of Francis Bacon*, 4, pp. 42, 373.

scandalous human stories that they told about other gods—stories which, in the end, made it impossible to take those gods seriously at all. But the name still expressed their awe and gratitude at being part of that great whole.

And today there is evidently more, not less, reason to feel that awe and gratitude, because we have learnt something of the scope of the achievement. The sense of life itself as active and effective throughout this vast development has been made far stronger, not weaker, by our understanding of our evolutionary history. This is the sense that Darwin expressed when he wrote, at the end of the *Origin*, ‘There is grandeur in this view of life’.

Intrinsic value and the social contract

It does not seem to me to matter much whether one calls this wonder and reverence religious or not except to people who have declared a tribal war about the use of that word. It is of course an element that lies at the root of all religions. In the great religions with which we are familiar, it always plays its part and is subsumed within a wider whole. Reverence for the creation can there quite properly inspire and enrich the reverence that is due to its creator.

But such wonder and reverence are equally essential to belief-systems that reject religion. All such systems involve some order of values, some pyramid of priorities which has to end somewhere. In order to make sense of our lives, we have to see some things as mattering in themselves, not merely as a means to something else. Some things have to have what the theorists call intrinsic value. Secular thought in the West has not dropped that notion. Instead, during the last century, it has simply decreed that human individuality itself is the only thing that has this status. Today it uses words such as sacred and sanctity readily to describe human life, but becomes embarrassed if they are used for anything else. People with this approach tend to be alarmed by the direct reverence for the non-human world that was expressed by people like Wordsworth and Rousseau and to treat it as something not quite serious.

Here we come back to the question that I mentioned at the outset about the possible reasons why the fate of the earth should concern us. The early twentieth century’s humanistic creed that only people have value—that non-human affairs do not matter except for their effect on people—means that there cannot be any such reason. This is the unspoken creed that leaves us—or at least leaves the professional moralists among us—so puzzled by the environmental crisis—by the thought that we might actually owe some direct duty to the biosphere.²⁶

Our individualism has accustomed us to using a minimalist moral approach which gives us no clue to such matters. But that minimal approach has, of course, already created a difficulty in explaining why each of us should be concerned about any other individual besides our own self in the first place; why our value-system should ever go beyond simple egoism. It answers this question in terms of the social contract which is supposed to make it worthwhile for each of us to secure the interests of fellow-citizens. The answer to the question ‘Why should I bother about

²⁶ John Passmore laid out this problem admirably in *Man’s Responsibility for Nature* (London: Duckworth, 1974), and it has continued to occupy environmental philosophers ever since.

this?' is then always 'Because of the contract which gives you your entrance-ticket to society'.

This contract model excludes dealings with anything non-human. It works quite well for political life—for which, of course, it was originally invented. But even within human existence it is notoriously inadequate. Even within our own lives, we know that we cannot think of rights and duties as optional contracts set up between essentially separate individuals. Relations between parents and children are not like this (and each of us, after all, started life as a non-contracting baby). Nor indeed are most of our personal relations. But we have not yet grasped how much worse this misfit becomes when we have to deal with the rest of the world.

Even over animals, the legalistic notion of contractual rights works badly. And when we come to such chronic non-litigants as the rain-forest and the Antarctic it fails us completely. Entities like these are not fellow-citizens. They never signed a contract. They know nothing of us. How, then, if duties are essentially contractual, can we possibly have duties to them? John Rawls raised this question rather suddenly as an afterthought at the very end of his famous book *A Theory of Justice* and could only say that it was one which lay outside his contractual theory.²⁷ He added that it ought to be investigated some day. But, as often in such cases, the real response has to be 'you shouldn't have started from here'. Rawls's book was the definitive statement of contract ethics and it marked the end of the era when they could pass as adequate.

Individualism is bankrupt of suggestions for dealing with these non-human entities. Yet we now have to deal with them, and promptly. They can no longer be ignored. Clearly, too, most of us do now think of the human drama as taking place within this larger theatre, not on a private stage of its own. The Darwinian perspective on evolution places us firmly in a wider kinship than Descartes or Hobbes ever dreamed of. We know that we belong on this earth. We are not machines or alien beings or disembodied spirits but primates—animals as naturally and incurably dependent on the earthly biosphere as each one of us is dependent on human society. We know we are members of it and that our technology already commits us to acting in it. By our pollution and our forest-clearances we are already doing so.

What element, then, does the concept of Gaia add to this dawning awareness? It is something beyond the fact of human sociability, which has already been stated, for instance by communitarians. It is not just the mutual dependence of organisms around us, which is already to some extent being brought home to us by ecology. It goes beyond thinking of these organisms as originally separate units that have somehow been forced to cooperate—as basically independent entities which drive bargains for social contracts with each other ('reciprocal altruism') because they just happen to need each other to survive. The metaphysical idea that only individuals are real entities is still present in this picture and it is misleading. Wholes and parts are equally real.

Recent habits make it hard for us to take this in. As science fiction makes clear, we are still amazingly ready to think of our species as a mere casual visitor on this

²⁷ John Rawls, *A Theory of Justice* (Cambridge, MA: Harvard University Press, 1971), p. 512, cf. p. 17. I have discussed this remarkable move in *Animals And Why they Matter* (University of Georgia Press, 1984), pp. 49–50.

planet, as something too special to have developed here. Of course it is true that we are a somewhat special kind of primate, one that is particularly adaptable through culture and gifted with singular talents. But those gifts and talents still come to us from the earth out of which we grow and to which we shall return. The top of our tree still grows from that root as much as the lower branches. We cannot live elsewhere. Our fantasies of moving to outer space mean no more than the magic tales with which other cultures have often consoled themselves for their mortality. Even people who still expect that move in the long term are beginning to see that it cannot be expected to arrive in time to relieve our present emergency. Since the end of the Cold War, NASA has found it increasingly hard to raise funds to keep space programmes going. And environmental disasters are likely to make that process harder, not easier.

All this means that, in spite of recent influences, direct concern about destruction of the natural world is still a natural, spontaneous feeling in us and one that we no longer have any good reason to suppress. Most people, hearing about the wanton destruction of forests and oceans find it shocking and—as has become clear in the last few decades—many of them are prepared to take a good deal of trouble to prevent it. This feeling of shock and outrage is the energy-source which makes change possible.

It has not, of course, been properly tapped yet. As happened over nuclear power, it takes a disaster to bring such needs home to people. Yet the feeling is there and it is surely already becoming stronger and more vocal. It is, of course, what leads people to subscribe to organizations trying to protect the environment. Though we have been educated to detach ourselves from the physical matter of our planet as something alien to us, this detachment is still not a natural or necessary attitude to us. Since we now know that we have evolved from a whole continuum of other life-forms and are closely akin to them—a point which nobody ever explained to Descartes—it is not at all clear why we should separate ourselves from them in this way. On this point, of course, the findings of modern science agree much better with the attitude of those supposedly more primitive cultures where people see themselves as part of the whole spectrum of life around them than they do with the exclusive humanism of the Enlightenment. They also agree better with most of our everyday thought. The element in that thought which is now beginning to look arbitrary and unreal is its exclusive humanism.

Indignant concern on behalf of the environment does, then, already exist. Our difficulty is that we cannot see how to fit it into our traditional morality which—both in its Christian and its secular forms—has in general been carefully tailored to fit only the human scene. How should we deal with this conceptual emergency? I do not think that it is very helpful to proceed as some moralists have done by promoting various selected outside entities such as ‘wildernesses’ to the status of honorary members of human society. If we claim (for instance) that a wilderness such as the Antarctic has intrinsic value because it has independent moral status, meaning by this that we have decided to grant it the privilege of treating it like an extra fellow-citizen, we shall sound rather inadequate. These larger wholes are independent of us in a quite different sense from that in which extra humans—or even animals—who were candidates for citizenship might be so. Our relation to them is of a totally different kind from the one which links us to our fellow-citizens.

There is, indeed, something unreal about the whole way of thinking which speaks of these places as though they were distinct individual ‘wildernesses’, units which are applying separately for admission to our value-spectrum. Though we divide them for our thought, they function as parts of the whole. At present, indeed, the Arctic and the Antarctic are letting us know this because their ice, melted by global warming, is affecting the entire state of the oceans. That process is already producing widespread floods which threaten the destruction of places such as Bangladesh and Mauritius and widespread damage elsewhere. Nearer home, it also looks liable to upset the Gulf Stream in a way that may drastically chill the climate of Europe. Without that convenient warming system, we in Britain would find ourselves ten degrees colder, sharing the climate of Labrador, which is on much the same latitude. And if that change happens it could apparently happen quite quickly. Globalization is not just an option offered to our culture. It is a fact that is here already.

The surprising inefficiency of selfishness

This is, of course, a prudential consideration. It may suggest that rational self-interest alone will be enough to guide us here—as Hobbes supposed it always would be. And of course it is true that self-interest should indeed drive us this way. The odd thing is that it does not.²⁸ The human imagination does not work that way. When things go well, we simply don’t believe in disasters. Long-term prudence, reaching beyond the accepted, routine precautions of everyday life, is therefore an extraordinarily feeble motive. Its weakness has lately appeared sharply in the failure of the electronic industry to provide in advance against the Millennium Bug. If humans are naturally rational and prudent—at least in their business hours—it should surely surprise us that for fifty years all these highly-qualified, intelligent and well-funded people have apparently been assuming that the twentieth century would never come to an end.

This example is interesting because—as in the case of our own death—that particular outcome was not in doubt. Prudence, however, is supposed to operate on probabilities as well as on certainties. And the increasing probability of environmental disaster has been well-attested for at least the last thirty years. During all that while, each time that the travellers in steerage pointed out that the ship was sinking the first-class passengers have continued to reply placidly, ‘Not at our end’. Only very gradually and shakily is this prospect beginning to be admitted as an influence on policy—a topic that should be allowed now and then to compete for the attention of decision-makers, alongside football and teenage sex and the Dow-Jones Index and European Monetary Union. Only gradually is it beginning to be seen that ecology is actually a more important science than economics—that the profitable exchange of goods within the ship is a less urgent matter than how to keep the whole ship above water. When the story of our age comes to be written, this perspective may surely seem surprising.

²⁸ I have discussed this fascinating point more fully in *Beast and Man* (London: Routledge revised paperback edition, 1995), ch. 6.

Our imaginations, however, are not ruled by our reason. We do not easily expect the unfamiliar, and major disasters are always unfamiliar. When we are trying to be prudent, our thoughts turn to well-known and immediate dangers, nervously avoiding a wider scene. That is why self-interest alone cannot be trusted to answer our question about why the earth should concern us. Of course prudence must come in, but unless other reasons are already recognized prudence usually manages to evade the larger topic. That is why we need to think about those other reasons—about the ways in which the terrestrial whole, of which we are a part, directly concerns us, and would still do so even if we could get away with abusing it. As I am suggesting, we shall never grasp the nature of that kind of concern so long as we try to model it on the civic concern that links fellow-citizens. *Duties to wholes, of which one is a part, naturally differ in form from duties to other individuals.*

Since the Enlightenment, our culture has made huge efforts to exclude outward-looking duties altogether from Western morality. Pronouncements such as ‘there is no such thing as society’ and ‘the state is only a logical construction out of its members’ are only recent shots in this long individualist campaign. But the natural strength of outward-looking concern can be seen from the way in which many such duties are still accepted. For instance, the idea of *duty to one’s country* still persists and it certainly does not just mean duty to obey the government. Again, even in our society, where the idea of *duty to a family, clan, locality or racial group* has been deliberately played down, those ideas still have great force whenever a particular group feels threatened by outside oppression. The current revival of nationalism among various groups, especially in the United States, and the emphasis laid on sisterhood by feminists, all testify to this force. In other cultures, where no attempt has been made to undermine it, its strength is unmistakable.

Another corporate claim which can operate powerfully is the idea of a *duty to posterity*. This is not just the idea of a string of separate duties to particular future individuals. It is rather the sense of being part of a great historical stream of effort within which we live and to which we owe loyalty. That identification with the stream explains the sense in which we can—rather surprisingly—owe duties to the dead and also to a great range of anonymous future people, two things which have baffled individualistic thinkers. Even when there is no conscious talk of duty, people who work in any cooperative enterprise—school, firm, shop, orchestra, theatrical company, teenage gang, political party, football team—find it thoroughly natural to act as if they had a duty to that enclosing whole if it is in some way threatened.

And this, it seems to me, is what is now beginning to happen about the earth itself, as the threat to it begins to be grasped. When an enclosing whole which has been taken for granted is suddenly seen as really endangered, all at once its hidden claims become visible. It would be good if we could accept the overwhelming existing evidence of a terrestrial emergency without needing to be hit by a disaster. But whatever causes that belief to be accepted, once it becomes so there is surely little doubt about the duty it lays upon us.

Our mainstream tradition has played down this corporate element in morals and that is not surprising. Political theorists such as Hobbes and Rousseau—and their contemporaries in active politics—wanted above all, to stop certain dominant groups, notably the Church, exploiting this loyalty for their own ends. They succeeded to an extent which would surely have astonished them if they could have foreseen it, and

which Rousseau at least would have found alarming. Between them, they managed to swing the balance of moral thinking right over to its individualistic pole.

As we have seen, they did not manage to destroy the idea of corporate duty entirely. *Fraternity* was supposed to be among the ideals of the French Revolution, though in practice it was usually thrust aside by Equality and Freedom. Rousseau himself did try to balance the individualism of his contract theory by introducing the idea of the General Will, a corporate will in the nation distinct from the mere summing of separate decisions—something to be relied on more deeply, something which individuals should seek out and follow. This and similar hints were developed by Hegel into a fully fledged Organic Theory of the State, by which individuals are always incomplete entities, more or less comparable with cells in a plant or animal, needing to find their place in a wider whole for full realization.

Up to a point this suggestion clearly has to be true. Most of us, if we can act freely at all, want to place ourselves within such larger groupings—families, clubs, friendships, orchestras, gangs, political movements. But it is a sort of doctrine which sounds very different according to which kind of larger group we have in mind. By bad luck, Hegel centred his theory on the nation-state and in particular on his own state of Prussia, which was then (in the early nineteenth century) preparing to dominate the rest of Germany and thereby the rest of Europe. Marx, following Hegel's organic approach, also expected his precepts to be taken up in Germany and, though he envisaged a distant time when nation-states would not be needed, he expected them to be the main social unit for the foreseeable future. As the eventual adoption of Marxism in Russia did not produce any sort of Utopia, it is not surprising that these two unattractive examples have put people off organic theories of society, or that many of them end up saying, with Nietzsche's Zarathustra: 'The State lieth in all the languages of good and evil; whatsoever it saith, it lieth; whatsoever it hath, it hath stolen'.²⁹

Thus, through most of the twentieth century, many prophets in the West have preached a kind of narrow and romantic individualism, a moral outlook which simply assumes that individual freedom is the only unquestionable value. This is a doctrine held in common by J.-P. Sartre and Ayn Rand. Despite the difference of style, the European and the American forms of it share a central message: social atomism. Both conceive the individual's freedom as negative—a matter of avoiding interference. Politically, however, there is rather an important difference because of the kind of entity that counts as an individual is different in the two versions.

The European version still speaks of individual people and therefore stays close to real anarchism. The American one, however, expands to include 'commercial freedom'. And commercial freedom, in its modern form, is a different thing and a very strange one. The entities which it conceives as free are no longer individuals but corporations, often very big and impersonal ones. The rhetoric of 'free trade', in fact, does not now refer to individual freedom at all. The old romantic vision of commercial freedom which (as we shall see in a moment) Herbert Spencer presented in the 1880s—a vision of heroic individual tycoons carving out the course of evolution with their bare hands—does not fit today's conditions at all, whatever may be thought of its exactness in his own day.

²⁹ Friedrich Nietzsche, *Thus Spake Zarathustra*, part 1, section 'Of The New Idol'.

There has, in fact, been an extraordinary shift here in the central tenet of individualism. The metaphysical belief in human individuals as the true atoms of social life—the only properly real and sacred kind of unit—has given way. At the moment, the focus has shifted to another kind of entity, the big corporation. But since that kind of entity, in its turn, is now beginning to look rather less than ultimate—since the Internet is threatening its supremacy by building a more diffused way of doing business, while individual speculators infest it from within and shake its control—this does not seem likely to be the end of the story. These corporations may prove to be dinosaurs, entities remembered only as we remember medieval guilds. What surely emerges is that the whole idea of a single favoured, exclusively real unit was mistaken in the first place. *Life goes on on various scales, each of which is real and has to be thought of in its own terms.*

This shift of emphasis to a kind of corporate freedom is, however, just one more indication of how—as communitarians have recently been pointing out—individualist propaganda cannot destroy the corporate element in morals. Of course we still value our personal freedom very highly. Psychologically, our emphasis on it may perhaps be largely produced by overcrowding, by the sheer increase in human numbers and in social mobility during the last century. We all see far more people, especially far more strangers, in our daily lives than our ancestors did, which certainly imposes stress and social exhaustion.

Yet humans—even modern, civilized humans—are still social animals to whom, on average, the desolation of loneliness is a much worse threat than the interference of their fellows. On the positive side, too, we have talents and capacities which absolutely require generous, outgoing cooperation for their fulfilment—a point which Hegel got right. Paradoxically, there are many things which a free, solitary individualist is not free to do. He cannot be a parent, a quartet-player, a tragic actor, a teacher, a social reformer or even a revolutionary. Even Nietzsche's Zarathustra noticed this difficulty:

A light hath dawned on me. I need companions ... living companions which follow me because they desire to follow themselves—and to go to that place whither I wish to go.³⁰

In fact (as Butler pointed out against Hobbes), apart from certain narrow political contexts human beings are not in the least like the pure, consistent, prudent egoists that social contract thinking requires. And today people are coming to see this.

Of course it is true that we need to stop the powerful oppressing the weak, so we must have political institutions to prevent the exploitation of these corporate loyalties. That is why we need a free press to answer the propaganda of governments. And since the press itself comes under commercial pressure, that pressure, working through the labour market, through advertisements and through countless other channels, is, on the whole, much more alarming today than the power of religion. But the need to ward off these dangers cannot mean that we can do without corporate loyalties altogether. The outgoing, social side of human life vitally needs them.

³⁰ Nietzsche, *Thus Spake Zarathustra*, Introductory Discourse, § 9.