

4 Doing Nothing

We all sorely complain of the shortness of time, and yet have much more than we know what to do with. Our lives are either spent in doing nothing at all, or in doing nothing to the purpose, or in doing nothing that we ought to do. We are always complaining that our days are few, and acting as though there would be no end of them.

Seneca

The last chapter might have convinced you that action on climate change is morally required. In particular, there's a lot of moral weight on the shoulders of developed or rich countries, and there's considerable pressure on the developing world to take action too. To think again about just a part of the argument, the developed world has used and continues to use an enormously disproportionate share of the carbon sinks of the world. Some of the premises on the table already can lead you from this fact to the preliminary conclusion that fairly drastic emissions cuts are necessary, requiring enormous changes in the way our societies generate and use energy. Before we get carried away, though, there might be good reasons for delaying or avoiding serious action, maybe just taking minimal steps, or possibly doing nothing. In this chapter, we'll have a look at some of the reasons offered for doing little or nothing at all.

UNCERTAINTY

Many of the world's biggest polluters have grounded inaction in reasons having to do with uncertainty in the science of climate change. In a prepared statement outlining the administration's reasons for failing to ratify the Kyoto Protocol, George W. Bush maintains that 'we do not know how much effect natural fluctuations in climate may have had on warming. We do not know how much our climate could, or will change in the future. We do not know how fast change will occur, or even how some of our actions could impact it.'¹ Uncertainty might be the most common reason offered for doing little or nothing about climate change.

Here is a way in to worrying about this sort of uncertainty. Doing something about climate change is going to involve some costs. Maybe it will cost a lot. If a nation commits resources to dealing with climate change, then obviously it is making a number of choices, going down one path and not another. Think just about the choices that matter most to many people, namely the economic ones. Money spent on, say, moving away from fossil fuels is money not spent on other things, like education, roads, housing and defence. These things make a difference in the lives of people, the lives of voters, and they can seem much more real and pressing than the distant threat of a few extra centimetres of sea level. Worse, what if we are wrong about climate change? What if we end up wasting money which might have been well spent?

It is easy to fall into these worries, and it is probably a lot easier if you are a policy maker who wants to keep her job, who has to explain her choices to people who want a piece of her government's spending. It matters to officials who want more than a job, who want to do what's best or right. Before money follows a problem, you could reasonably think if you were in her shoes, you have to be sure it's a problem and you have to be sure that you know what to do about it. We'll leave some other uncertainties – those having to do with economics as such – for the next section. What's needed now is certainty or at least high confidence in the

science of climate change, but we are talking about the weather. We don't know for sure if it's going to rain tomorrow, so how can we possibly know about flooding in 2050? Is this sort of thinking well-grounded? Is Bush right to claim that we do not know how much effect natural fluctuations in climate have had on warming, how much our climate will change or how fast change will occur? More importantly, is this sort of uncertainty grounds for doing little or nothing?

You have heard a lot about what we know in Chapter 1. In particular, you have heard that the greenhouse effect is well understood. We also know that we are increasing the amount of greenhouse gases in the atmosphere by burning fossil fuels and using the land in certain ways. We know that this is making the planet warmer – we can expect between 1.1 and 6.4 degrees of warming in this century. We know that a warmer planet will bring with it heat waves, extremes of weather, new zones for the transmission of disease, changes to crops and the availability of water and so on. It won't hurt to be a bit more specific.

The IPCC tells us that the warming of the climate system is 'unequivocal'.² It has '*very high confidence* that the globally averaged net effect of human activities since 1750 has been one of warming'. Helpfully, the IPCC tells us exactly what it means by '*very high confidence*': at least a 9 out of 10 chance of being correct. It is '*virtually certain*' (which it defines as having more than 99 per cent probability of occurrence) that our future will be characterized by warmer and fewer cold days and nights over most land areas, as well as warmer and more frequent hot days and nights. It is very likely (more than 90 per cent probability of occurrence) that heat waves and heavy precipitation events will increase in frequency. It is likely (more than 66 per cent probability of occurrence) that the area affected by droughts will increase, as well as the intensity of typhoons and hurricanes. Increases in the amount of precipitation are very likely (more than 90 per cent probability) in high-latitudes, and decreases are very likely in subtropical land areas.

These projections are just for the present century. Beyond that, things really do get a little murky. For example, the IPCC says that it is very unlikely (less than 10 per cent probability of occurrence) that the deep ocean currents, like the Gulf Stream, will undergo an abrupt change before 2100. You can flip the statistic around and frighten yourself with the thought that, so far as we can tell, there's a 10 per cent probability that our activities actually will result in an 'abrupt transition' in our century. It is, however, very likely (more than a 90 per cent probability) that the circulation in the Atlantic will only slow down in the short term. Longer-term changes, though, cannot be assessed with confidence. Do bear in mind that we are now reflecting on the flow of ocean currents which keeps England and Europe generally a green and pleasant land – at least a more clement land than other places of the same latitude, like Greenland. It seems nearly certain that our activities are changing this, but there is uncertainty too: we don't know how dramatic the change will be or how soon the drama will come. If that is not unsettling, then maybe the following uncertainty is.

After 2100, the melting of the Greenland ice sheet and its contribution to sea-level rise might well become very worrying to an enormous chunk of humanity. If temperatures increase by anywhere between 1.9 and 4.6 degrees compared to pre-industrial levels – and they look set to do so according to many models – and if this increase is sustained for long enough, then Greenland will melt entirely. This would add another 7 metres to sea level. That's enough to swamp whatever low-lying areas you care to mention: vast and heavily populated tracts of China, India, Bangladesh, Egypt, probably all of The Netherlands, as well as cities like New York, Washington, Tokyo and London. There is uncertainty here – we don't really know whether Greenland will melt entirely – but the uncertainty makes me nervous.

There is a sense in which uncertainties like those associated with the prospects for the Gulf Stream and Greenland's ice can make you more inclined to action on climate change, not less.

When there's so much to lose, you don't need to be entirely certain to take preventative action, do you?

The IPCC admits to plenty of shorter-term uncertainties too. We do not fully understand what the carbon sinks of the world are up to, nor is the influence of clouds on the magnitude of climate change transparent to us. We only partially understand the effects of the oceans and the ice sheets on our climate. The dreaded positive feedback mechanisms themselves are only slowly coming into view. We understand all of this better as time goes on, but, worryingly, the more we know the more we revise our estimates of temperature increases upwards and timescales downwards.

It's important to understand just where the uncertainty lies. The many things we still don't understand all that well, the IPCC and others stress in various ways, make us unsure of the timing and the magnitude and the regional patterns of climate change. What is not in doubt is the fact of climate change and the human role in it. We know we are warming the world and we know how we are doing it. We aren't sure exactly how hot it will get or how quickly it will heat up, nor can we say just where the deserts, droughts, floods, fires, crop failures and refugees will be. There is a lot we cannot be certain of at present, but, the IPCC warns darkly, we also 'cannot rule out surprises'. We don't know what will happen to things like Greenland and the Gulf Stream.

Think again of that policy maker who frets about spending. There are at least two aspects of her uncertainty. She needs to be certain that there is a problem, and she needs to know what to do about it. There is no room at all for uncertainty about the existence of the problem of climate change. The seriousness of the problem is not in question either. Do we know what to do about it? We have at least the clear outlines of an answer: we should try to head off the worst of the possible changes to our climate by reducing greenhouse-gas emissions now, and we should prepare as best we can for the changes which have already been set in motion. The uncertainty, really, concerns only the timing and extent of the required cuts and preparations. We do not know how swift the

changes to our societies need to be or how large they need to be. We don't know how much longer we can get away with the high-energy lives we've got. Maybe putting it that way makes our to-ing and fro-ing about action on climate change sound self-interested. Maybe that's just what it is.

Look away from that nauseating thought and focus your attention on the uncertainty we face. We know there are dangers ahead, but we don't know exactly what to do or exactly when to do it. Is this sort of uncertainty grounds for doing little or nothing? It helps to imagine an easier but similar case. Suppose you are considering the purchase of a house with a fine cliff-top view. You have heard about coastal erosion and decide to have a survey done. The survey tells you that the rate of erosion has been fairly slow over the past 100 years, but there is reason to think that its pace is increasing. Eventually the house will have to be abandoned – maybe in 50 or 100 years or, just maybe, sooner than that. You can't help thinking that it's a fine view. You make a few bad jokes about 'living on the edge' and buy the place anyway. You do take out insurance, however, and make sure that the place is covered just in case the worst happens. You were right to have the survey done. You are right to take out insurance.

When confronted with this sort of uncertainty – uncertainty which isn't about the fact of some future disaster but concerns what to do about it now – the right thing to do is to take precautions. This kind of uncertainty is grounds for taking action, not a reason for doing nothing. It would be odd to hear a person say, 'I know the house will fall over the cliff eventually, but I'm not sure when. So I'm not going to do anything about it.' You might sit such a person down and talk to him, very slowly. Maybe you should consider shaking him a little.

There are lots of variables which come into play when we make decisions in the face of uncertainty. The amount of uncertainty, obviously, makes a difference. If there were only a very small chance that the cliff might erode, then our conclusions about buying the place as well as buying insurance might have been different. The

level of danger matters too. If we were worried about something less dramatic than the house falling over a cliff – maybe we are just concerned about the prospects for an outlying tool shed – then our thoughts about what to do might change. Sometimes our decisions are pressing, and this fact alone can force us into action in the face of uncertainty. Maybe I'd like to learn more about the chances that the cliff face will erode, but I know there are other buyers sniffing around the place, so I act more quickly than I would have otherwise. Who we put at risk through our actions can matter as well. You might forgive me for moving into the house on my own – maybe I'm putting myself in danger, but I'm doing so with my eyes wide open. If I know the place is dangerous, and I quietly sell it on to an unsuspecting family, you would be right to condemn me for putting others at risk. Maybe you have an obligation to stop me.

Think about these variables and climate change. Probably we should not be put off by the amount of uncertainty concerning climate change. As we've just seen, there's plenty of certainty where it counts. Further, the sort of uncertainty seems to warrant action, not inaction. The level of possible danger, too, seems more than high enough to act on. If it's true that the demand for action ought to be in proportion to the level of danger, then thoughts about the sharp end of some projections should be enough to lead to action. It is also true that our decisions are pressing. The planet is already changing, and it will continue to change before we manage to dispose of every niggling uncertainty. It's clear that we'll have to act long before we see some of the effects of climate change if we hope to avoid them – it takes a while to implement societal changes, and it takes a while for those changes to make a difference to our world. Probably we cannot wait until the worst of it is breathing down our necks. Finally, continuing on the present course puts innocent people at risk. We already know that the fact that some of those people are far away and that others have not been born shouldn't make a moral difference to us.

These thoughts, though only rough and ready, jive with our everyday, pre-reflective conceptions of danger, risk, uncertainty

and action. There's plenty of room for tightening all of this up, but what we have is enough for me to conclude that at least one kind of uncertainty cannot give us good grounds for doing nothing about climate change. Other sorts of uncertainties are possible, of course, and we'll come around to some of them in a moment. If these garden-variety thoughts about the sort of uncertainty under consideration are not enough for you, maybe you need the support of an upscale moral principle or two.

The precautionary principle guides a lot of thinking in this neighbourhood. Maybe it's rooted in something close to moral bedrock: the no-harm principle or the general injunction against knowingly hurting others, all things being equal. I shy away from the precautionary principle because I take it that the rough and ready stuff is enough to go on, and also because I'm still not quite sure how to interpret the many versions of the principle itself, to say nothing of the attending implications of the many versions. My caginess shouldn't stop you from thinking about it carefully or even accepting it, if you like.

The precautionary principle has many incarnations.³ Dubious versions can seem to restrict more or less any action which stands even a small chance of having adverse effects. More plausible characterizations of the principle take it that when we do not fully understand the effects of some technology or practice, the burden of proof when it comes to safety falls on the advocates of the technology or practice in question. If I have some doubts about your genetically modified beans, it's up to you to assuage those doubts. Until then, we err on the side of caution and keep your bizarre beans out of the ground.

There's trouble with thinking even of this sketchy version of the principle. What if my doubts are unreasonable? If you modified the beans, probably you know a lot more than I do about the dangers associated with them. So why should my doubts count for so much more than your certainties? Then again, if you modified the beans, maybe you have an interest in seeing the technology behind them go ahead – maybe you're willing to ignore your own

reasonable doubts. While we're on the subject, what counts as a reasonable doubt? You can take these points and nevertheless look away from them, hoping against hope for rationality on all sides of a debate. You can also look away from dubious versions of the principle and focus just on perhaps the most relevant version, given our purposes.

This is written into the Rio Declaration, agreed by over 160 nations at the Earth Summit in 1992:

In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats to serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

This way of putting the principle does at least a few things. It reminds us that we do not need to be fully certain about damage to the environment in order to act against its possibility. It also reminds us that it is possible to know that something serious should be done but have doubts about the particular nature of the serious action needed. Those doubts, that uncertainty, should not be confused with being uncertain about the necessity of action itself. The lack of certainty, in this sense, cannot be a good reason for postponing precautionary action.

COSTS

There are several thoughts associated with the conclusion that we should avoid action on climate change because the cost is prohibitive. It might be claimed, quite simply, that doing something about climate change would just cost too much. Therefore, we shouldn't do anything. Although simple-minded, the conclusion gets you where you live. This might be why Bush pointed to economic worries when opting out of Kyoto. As he put it: 'complying with those mandates would have a negative economic impact,

with layoffs of workers and price increases for consumers.⁴ Prominent Australians have recently made just the same claim. Relieved of buzzers, bells and high-minded preludes, the argument just is that such and such a proposal for action on climate change must be rejected because it will do damage to the economy, result in job losses, maybe ruin our current wealth or standard of living.

Just as it stands, there is something vicious about this. In the last chapter, you heard a great deal about the moral requirements for action. Can those requirements be overridden by talk of expense? Would you forgive someone for avoiding a moral obligation because he thought that it might cost him too much? He'd rather not give up his holiday in Bermuda, so those childcare payments will have to wait. If you think a little about the causes and effects of climate change – our easy high-energy lives as compared to the suffering which greenhouse-gas emissions cause and will continue to cause – you can come to the conclusion that avoiding action on climate change just because it might be expensive amounts to harming other people for money. That's the vicious bit.

It is possible, though, to recognize the existence of moral obligations for action, but couple this, quite rightly, with the aim of ensuring that money is well spent. There are numerous treatments of the economics of climate change which use a variety of models and forecasting methods, and they can tug in at least two general directions.

Some issue in the conclusion that we ought not to spend much on climate change.⁵ Perhaps the most famous as well as the most controversial claims in this connection are made by Lomborg. He argues that we might spend our money dealing with any of a number of social ills – HIV, malnutrition, trade barriers, poor drinking water, malaria and so on. Climate change is just one of the world's troubles. We can do a lot more good, he maintains, if we put our money towards tackling other things and devote a relatively small amount of funding to, say, the research and development of renewable resources. He claims, for example, that implementing

the Kyoto Protocol would cost the world as much as £180 billion each year, and what we would get for that investment isn't much: only a small delay to the heating of the planet. Much less, around £80 billion each year, would give everyone in the developing world access to basic healthcare, education, water and sanitation. Doing something about climate change would cost us a lot, we wouldn't get much return for that cost in the form of future benefits to humanity, and we could spend the money better on other things, right now.

Other analyses, in particular those put forward in the Stern ^{Stem} Review, issue in a very different conclusion: the benefits of strong, early action on climate change outweigh the costs considerably.⁶ Doing nothing or anyway very little to curb greenhouse-gas emissions will, Stern argues, cost the world at least 5 per cent of global gross domestic product each year. If some of the worst case scenarios are realized, the cost could be as much as 20 per cent of global GDP. In individual terms, every person on the planet will be about a fifth poorer than she might otherwise have been unless we undertake effective action immediately. That's an average, of course, and it means some people could be much, much worse off. Memorably, Stern argues that the major economic and social disruptions ahead, if we fail to do enough, are 'on a scale similar to those associated with the great wars and economic depression of the first half of the 20th Century'. It's not difficult to think that things will be worse than even this. However, the cost associated with taking strong action to cut emissions could be limited to as little as 1 per cent of global GDP per year. That's still serious money, but spending it now could ensure not only that we avoid the worst, economically speaking, but also that our economies stand a chance of continuing to grow. Doing a lot right now will not just save us from disaster, but the investment will bring dividends.

The IPCC, for its part, notes that a review of the literature on the economics of climate change turns up large ranges for the social cost of carbon emissions in particular and a number of different economic variables in general.⁷ This is largely due, it says, to

'differences in assumptions regarding climate sensitivity, response lags, the treatment of risk and equity, economic and non-economic impacts, the inclusion of potentially catastrophic losses and discount rates'. In other words, the various models operative in economic analyses of climate change depend on a large number of assumptions, and the ones you make can have a dramatic effect on what your model says and, ultimately, what you think about the costs of proposals to deal with climate change. Valuations involve value judgements, and it nearly goes without saying that reasonable people can disagree about such things.

While there is certainty associated with some aspects of climate change, there is considerable uncertainty in the science where it counts for economic assessments: namely, it's hard to say just where and when the trouble will be regionally. Accurately quantifying uncertain damages is not easy. Maybe it's not possible. It is also hard to evaluate irreversible planetary damages. How might one begin to put a dollar value on the loss of whole species or ecosystems or people? How much is the Antarctic ice sheet worth to you? You can muddy the waters for yourself, if you like, by noticing that not everyone will agree about how much, say, a rain-forest matters. This disagreement is not necessarily quantitative. Is my aesthetic valuation of it on a par with a local's view of it as a valuable source of food and lumber? What about the value another local places on it as his spiritual home? How do we match this up with someone else's conception of it as a valuable carbon sink? You can make matters even worse by noticing that it's not just all of our valuations which must figure into our reflections. How much will that forest be worth to the next generation, or the next, or the next? All of these interests matter too.

These considerations can lead you to the conclusion that economic analyses depend on something further upstream, namely our thoughts about what matters to us – what it is that we value. This is to say something much more than that economic models cannot hope to take account of the complexities and uncertainties ahead. It's not to object to this or that discount rate or to the

sensitivity of some model or other. Instead, the claim is that reflection on values generally is conceptually prior to reflection with economic or monetary values in hand. We need to come to conclusions about the former before we can even take a step with the latter.

If this or something like it is the right way to think about the costs of climate change, then it seems clear that our conclusions about action cannot depend on the cost of action alone. Our conclusions about the cost of action depend on our assumptions concerning how much certain things matter to us. Those assumptions, which ultimately have a huge effect on our economic picture of the world, are themselves outside of economics. It is questions about value which need to be asked, not questions about costs. Putting costs first and claiming that costs inform our conclusions about our values is to get things exactly backwards.

TECHNOLOGICAL RESCUE

Reflection on technology and action on climate change is usefully divided into two different sorts of claims or hopes. First, one might say that some future technology will somehow save us from the worst of climate change. No action is needed now, one might think, because we'll eventually find a technological solution. We always find technological solutions to our troubles. Why should the problem of climate change be so different or difficult to solve? Second, and with a slightly straighter face, one might say that the technology we've got will save us from the worst of climate change. Maybe we can avoid serious efforts now because enough windmills and solar cells and carbon-storage systems will cut our emissions for us while our lives go on much as they always have. We'll briefly think a little about both of these possibilities.

Many put a lot of faith in largely untested, sometimes unknown, technological innovation. The thought, which might strike you as wishful thinking rooted in science fiction, has a number of adherents. Worryingly, the US might be its loudest advocate.

To take one of several recent examples, a part of the US's response to an early draft of the IPCC's 2007 report on the mitigation of climate change argues that 'modifying solar radiance may be an important strategy if [the] mitigation of emissions fails. Doing the R&D [research and development] to estimate the consequences of applying such a strategy is important insurance that should be taken out. This is a very important possibility that should be considered.'⁸ By 'modifying solar radiance', the author means a kind of geo-engineering or terraforming, in this case reflecting some sunlight back into space in order to achieve a reduction in the effects of climate change.

Some have argued that a giant reflective screen might be put into orbit. We might waft a million little silver balloons into the atmosphere to reflect the sun's rays. The prospect of delivering a huge quantity of sulphate droplets into the atmosphere by rocket-powered explosives in an effort to simulate the cooling effects of a massive volcanic eruption has been countenanced. The quotation above calls talk of geoengineering 'insurance' that we should have just in case we fail to act in time. Maybe something will come of all of this, and there is no harm in keeping our options open. Our question, though, is whether or not the hope that we'll one day have space mirrors and such is a good reason for not acting now, for doing little or nothing?

Try to ignore the deeply dubious thought that we just might get lucky. Someone, somewhere, might invent something which does something else and saves us from climate change. Somehow. Think just for a moment about more concrete possibilities, perhaps the chance that geoengineering will stop the planetary changes we have put in motion. Maybe we can return ourselves to the climate of our largely stable, water-coloured, pre-industrial world by tinkering with sunlight itself. Think about a million little silver balloons boldly nudging aside the clouds. Think also about our planet's fidgety regulatory systems, which are now apparently out of kilter or anyway behaving in a manner we don't fully understand. Will a million little balloons fix it?

The IPCC is dismissive: 'Geo-engineering options . . . remain largely speculative and unproven, and [carry] the risk of unknown side-effects.'⁹ Maybe being dismissive is not enough. There's no harm in wishful thinking, unless it stops you from doing something effective when something effective needs to be done. When wishful thinking takes the place of recognizing moral responsibilities, like those outlined in the previous chapter, the harm becomes a moral mistake. The damage which might have been avoided becomes the wishful thinker's fault. There is a lot of damage ahead if we fail to act. Opting for wishful thinking instead of action when there is so much at stake is something more like moral recklessness.

Science fiction to one side, there is the thought that the technology we already have will save us from the worst of climate change. Part of the hope in this connection has to do with the belief that we can avoid at least some meaningful action now because the implementation of certain technologies, either in hand or just on the horizon, will cut emissions for us. We can keep our televisions on standby if we simply switch to solar power. This line of thinking dangerously underestimates the amount of action required just to implement the technology we have.

In a thought-provoking paper which received a lot of attention both inside and outside of academe, Pacala and Socolow argue that the technology now exists which could enable us to stabilize carbon emissions at present levels within 50 years.¹⁰ Stabilizing at present levels is one target which may or may not be enough to save us from the kind of temperatures which could bring with them awful changes to our world. If stabilization were achieved, we might then have to worry about reducing carbon levels. Still, stabilization in the medium term is considered by many to be a goal well worth having. Before you get the champagne out, though, bear in mind that even stabilization requires a massive effort on a planetary scale.

Imagine a graph with rising amounts of carbon-dioxide emissions on the vertical axis and time on the horizontal one. If you

chart the increase in emissions observed over time, you get a clear trend upwards. If a point representing our current emissions were plotted on the graph, two lines might be drawn from it representing two pathways: a straight, horizontal stabilization line, a path to a world where emissions are held at present levels; and a line continuing upwards, showing carbon levels if nothing is done to curb emissions. Close the figure and you have what Pacala and Socolow call 'a stabilization triangle'.

The task is to find 'stabilization wedges', strategies which save emissions and flatten out the current trend in the direction of stabilization. Each wedge prevents a billion metric tons of carbon per year from being emitted by the time we reach the middle of the century. At the time the paper was written, 2004, Socolow claimed that we were emitting around 7 billion metric tons each year and were on course to emit 14 billion metric tons each year by 2054. It follows that 7 wedges are needed for stabilization. Pacala and Socolow identify 15 wedges. This stabilization strategy, this way of thinking about possible technological solutions, Socolow says, 'decomposes a heroic challenge into a limited set of monumental tasks'.

Think about just the two best-known renewable sources of energy: wind and solar power.¹¹ Consider wind power first. To get one wedge out of windmills, the world would need 2 million 1 megawatt windmills, replacing our current reliance on an equivalent amount of energy generated by coal. We have about 40,000 such windmills, just 2 per cent of what's needed for the wedge. It's worth noting that in the UK getting a single wind farm up and running takes years of bureaucratic fussing – mostly because locals would rather not have unsightly turbines messing up the fine view. What about solar panels? By the middle of the century, we would need 700 times the current capacity for a single wedge. This would require panels covering about 2 million hectares or 7,700 square miles – a land mass about the size of New Jersey or Israel. If weather patterns shift by the middle of this century, will our millions of windmills and miles of solar panels even be in the right places?

What about carbon capture and storage, the touted process by which carbon dioxide is snagged during power production and prevented from getting into the atmosphere? The technology is new, and there might be serious long-term troubles associated with it, but to achieve a wedge we would have to pump carbon dioxide into storage at about the same dizzy pace which we currently pump oil out of the ground. At present, only a handful of companies are experimenting with carbon capture and storage. Compare them to the huge number of facilities we have for sucking oil out of the Earth to get a grip on the huge effort required just for this wedge.

Could we be saved by biofuels? To get one wedge by around 2050, we would have to replace 2 billion of the fossil-fuel powered cars we would be driving by then with new vehicles running entirely on clean biofuels. These cars would also have to manage 60 miles per gallon, rather than 25 or so which is the current average. Supplying these cars with fuel would require the cultivation of 250 million hectares or about a million square miles of high-yield crops – roughly one-sixth of the world's cropland. There are growing fears that the race to produce biofuels is already leading to changes in land use which cause climate change – desperately poor farmers are burning rainforest for space to grow biofuel crops. In 50 years, when food crops are failing, growing seasons have shifted, droughts threaten, people are starving and on and on, will we really want to devote so much of whatever fertile land we have to feed cars rather than people?

There has been a lot of talk about hydrogen, the hydrogen economy and hydrogen fuel cells. The US has made much of the prospects for hydrogen, but at present hydrogen is not even an energy source – it takes more energy to produce hydrogen fuel than the fuel can deliver. Further, hydrogen is only as carbon-free as the energy source we use to produce it. The production processes available are costly, and the cheapest options at present result in carbon emissions. Storing the stuff isn't easy either. Because hydrogen happily exists as a gas, not a liquid, it requires a

lot more space than petrol. The hydrogen fuel tanks on your new hydrogen-powered car might be considerably larger than the car you drive now. Storage problems could be solved by persuading hydrogen to exist as a liquid, but only at the cost of the energy required to get the stuff's temperature down to ridiculously low levels. Hydrogen might be a clean source of energy eventually, but, according to many estimates, we'll be waiting for about 50 years before we begin to see it. Promising, but it's no help to us right now.

You can come around to thinking that just about all of the technological 'solutions' on hand are like windmills, solar panels, bio-fuels and hydrogen: they are all certainly worth pursuing, but none can solve our problems for us. None of the possible paths look easy. The conclusion is not entirely pessimistic – certainly Socol and his colleagues are not doom and gloom mongers. Their hope is to convince us that we need to pursue these technologies immediately if we are to do something meaningful by the middle of the century. At any rate, there is no reason at all to think that we can put off serious action in the hope that technology will rescue us. Just the opposite is true: Herculean efforts are required right now and for the foreseeable future if technology is to be of any help at all. What's clear is that we cannot go on as we are. We cannot reasonably cross our fingers, continue to build coal-burning power plants and drive SUVs, all the while thinking that technology will reduce our emissions for us. Probably what we have to do – in addition to enormous technological efforts like those scouted above – is change our lives. Instead of finding technological solutions for our energy needs, we have to find ways of needing less energy.

WAITING FOR OTHERS TO ACT

The claim that action on climate change should be postponed until others act takes a number of forms. Although an advocate of at

least some action, Tony Blair has suggested that even if all of Britain's emissions were somehow instantly and magically stopped right now, in less than two years the growth in China's emissions alone would wipe out the difference. A reason given by Bush for opting out of Kyoto is that the agreement fails to make demands on countries like China and India. There are several thoughts worth disentangling here.

It certainly is true that some countries – China and India are the usual suspects – are developing at an astonishing rate. According to many estimates, China has already overtaken the United States as the world's biggest emitter of greenhouse gases. There are lots of ways to measure this sort of thing. It is worth pointing out that the US will continue to lead the world in per capita and cumulative emissions for quite some time, even in the face of explosive growth in the East. The average Chinese person is still responsible for much less than the average amount of emissions per capita on the planet – four or five times less than the emissions of the average American, and around two times less than the emissions of the average European.¹² Both India and China have rapidly expanding economies, growing middle classes with disposable incomes and human desires, and soaring energy demands. Both countries are also powered almost entirely by fossil fuels.

The first sort of worry to have about all of this, the Blair worry, can seem rooted in a kind of world-weariness: no matter what our efforts might be, the developing world's new emissions will simply swamp them. Say that the Kyoto savings on emissions will amount, in total, to around 500 million tons of greenhouse gases per annum by 2012.¹³ By the same year, thanks to newly built, shiny coal-burning plants, India might well blot out the savings with around 500 million tons of brand new emissions each year. China could be emitting as much as 2,000 million tons of greenhouse gases from new power plants alone by 2012. If our efforts are more than cancelled out by their emissions, it's hard to see the point of our efforts.

The second worry to have, the Bush worry, might be rooted in a

strangely blinkered conception of fairness. Some in the US have admitted that the US is responsible for a lot of the planet's annual emissions, but not all of them. Emissions are emissions, and the Earth does not care where they originate. Before the US does its share, it has to be sure that the rest of the world will do its share. Because Kyoto does not place restrictions on the emissions of some large developing countries, the US argues, it's a 'flawed treaty', and the US simply will not sign up. There's a kind of weird logic in this. It's not quite as careful as a prisoner with a dilemma. Instead, it can seem oddly reminiscent of the doublethink characteristic of *Catch 22*:

"... Let somebody else get killed."

"But suppose everybody on our side felt that way."

"Then I'd certainly be a damned fool to feel any other way. Wouldn't I?"

If everyone else is emitting greenhouse gases without limit, then the US would be foolish to limit its own emissions. Wouldn't it?

One of the first things to notice in this connection is that both worries seem to miss the fact that the requirements for some sorts of action, particularly morally demanded action, are not contingent upon the action of others. If doing something is the right thing to do, it remains the right thing to do whether or not others are doing it too. If it's wrong, it's still wrong even if everyone does it.

Second, although it is true that sometimes it makes sense to refuse to act when others fail to pull their own weight, the case of climate change is different. I might, with reason, go on strike and leave my dirty dishes by the sink if my flatmates fail to tidy up after themselves. This failure to do what's normally required of me is ultimately self-defeating – eventually I'll have no clean plates for myself – but maybe my point will be taken, and my filthy friends will clean up after themselves. However, as Singer puts it:

that is not the situation with climate change, in which the behavior of the industrialized nations has been more like that of a person who has left the kitchen tap running but refuses either to turn it off, or to mop

up the resulting flood, until you – who spilt an insignificant half-glass of water onto the floor – promise not to spill any more water.¹⁴

Singer's point, well-made, is that the industrialized world is not in the same position as a person refusing to act with good reason. The magnitude of the developed world's emissions is certainly a part of the difference. It's worth noting, too, that most of the industrialized world has at least agreed to start mopping up. The US's refusal to do so, against this backdrop, looks even more untenable.

You can ramp things up, put analogies to one side, and think seriously about the arguments for action, such as those considered in the previous chapter. The absorptive capacities of the planet are a scarce and precious resource. As Shue puts it, 'a huge store of ethical considerations that are irrelevant to unlimited supplies "lock in" when there turns out to be scarcity'.¹⁵ It matters who uses how much of the planet's sinks, because one person's use effectively deprives someone else of a share. Further, the shares matter a lot: given the way our societies are set up, eating, drinking and generally continuing to live a life depends on emitting greenhouse gases. Shue's point, which needs to be taken as seriously as possible, is that ethical demands are placed upon the users of a scarce and valuable resource just because the scarce and valuable resource is being used. It does not matter whether a country signs a treaty, whether a country meant to deprive others, or whether other countries are pitching in too. The moral demand is there no matter what others do.

Maybe it's possible to have a little more time for the first worry, rooted as it is in world-weariness. You can end up with your head in your hands, more often than you'd like, when reflecting on what sometimes seems like the futility of actions to limit emissions. If you undertake any action, even a morally required action, you can legitimately wonder about the point if your good effects are cancelled out immediately. If you are a consequentialist – say a utilitarian who holds that the moral value of an act is determined entirely by its consequences for human happiness – then discovering that your

act has no beneficial consequences is just to discover that your act is not morally required.

But the action undertaken by some countries right now will have beneficial consequences. Suppose 500 million tons of carbon dioxide are saved by the Kyoto Protocol. That 500 million tons is 500 million tons which were never emitted. It's 500 million tons off of the planetary total. Maybe, as some have argued, just taking steps in the right direction will make a significant difference in the future. Working towards saving those 500 million tons will teach us some lessons, perhaps make us better at saving the next 500 million tons. States might be expected to become more aware of the importance of action and take further steps – examples might be set for others. You might even try to peer through the confusing causal chains and think that saving 500 million tons of greenhouse gases saves future lives. These are all good effects which should figure into the calculations of any good utilitarian. I have doubts in this connection, and we'll get to them in the next chapter. Despite the doubts, the world-weariness can be given up.

URGENCY

We've just thought through the largest reasons given for delaying or refusing to act on climate change and found each one wanting. It would probably be wrong to find a single mistake in them, to try to reduce them all to just one sort of error of judgement. But there is something common to all of them, something which stands out a little if you look for it. Not one of the reasons for delaying meaningful action on climate change is based on a principle. Certainly there are no moral principles to be found in the arguments. There is not much talk of justice or equity or fairness or the value of human life. This fact might give you pause, might make you suspicious, might make you wonder what the real motivation for delay might be.

We looked away, quickly, from viciousness and recklessness

when we found it in the arguments above. Maybe we should give it a little attention now. A part of the argument against action based on scientific uncertainty seems remarkable for its recklessness. Somewhere in there is the deluded thought that we can reasonably continue with our high-carbon lives because we do not really know when or where the ecological disasters will come. It amounts to a kind of gambling with the lives of people elsewhere on the planet now or in the future – betting that we can keep our comfy lives a little longer, while only risking their lives in the wager. There is a similar viciousness in the thought that the cost of mitigation and adaptation should be a reason for doing little or nothing. It amounts to harming others for money. The recklessness shows up again in the wishful thinking underpinning the hope for a technological quick fix. It's a ludicrous risk, a bet that we can continue with our lives as they are in the hope that something unknown or untested might make everything all right in the end. There is viciousness in refusing to act unless others do too. It is nothing less than ignoring the moral demands on us while simultaneously trying to place moral demands on others. Hypocrisy joins the list of our failures here.

It is hard to escape the conclusion that selfishness is at the bottom of the arguments against action. The arguments can seem appealing only if you operate with the premise that our lives matter more than the lives of certain others. If my life matters more than yours, then risking yours for mine in various ways can seem like a reasonable course of action.

Against the arguments for doing nothing is a further and perhaps final general consideration. Nearly every fact we have about the climate and the world and ourselves points to the urgency of action. Think just about the timescales involved. Carbon dioxide remains in the atmosphere and contributes to the effects of climate change for hundreds of years. Some of the planet's regulatory systems can move at, well, glacial speeds. Technological changes like the ones considered a moment ago will take decades to implement. Scaling back generally, changing the structure of the

human world, probably won't happen overnight. A coal-burning power station built today will continue to do damage for its long operational life. The longer we delay – the more greenhouse gases we put in the atmosphere, the more forests we clear, the more damage we do – the more difficult it will be for us to reverse the processes we have set in motion. Some processes might not be reversible, but even slowing them down and thus giving us a better shot at adaptation is a goal worth having. The longer we delay, the worse our future will be. Any argument against action must somehow waft something more valuable than a better future for humanity in front of our noses. It is difficult to imagine what that something could possibly be.

5 Doing Something

It is not only for what we do that we are held responsible, but also for what we do not do.

Moliere

The last two chapters have shown that there is a moral demand for action on climate change and that there are no good reasons for avoiding it. Put simply, the governments of the world ought to do something meaningful about climate change. In this chapter, we will first consider what the world actually has done, then size up the moral case for two general kinds of proposal for what it should now do. It will help to have some criteria in hand, some standards we can use to judge the various proposals as well as the actions already undertaken. We'll have to get slightly technical, possibly a little high-minded, in this chapter, maybe stick closer to talk of criteria and proposals and historical facts than I might otherwise like. It might be rough sledging, but the pay-off is worth it. We'll end up with a clearer understanding of what action on climate change has been and ought to be.

Before we get underway, though, spare a moment for a brief fantasy. Imagine a world which took the 1990 reports of the IPCC very seriously. The governments of this world, acting prudently and in unison, immediately thrashed out mechanisms for eliminating greenhouse-gas emissions as quickly and as extensively as possible. The developed countries implemented and shared green technologies, cutting emissions and enabling the poor to

leapfrog into cleaner economies; forests were protected everywhere, and new ones were planted; policies ensuring energy efficiency in transport and industry took effect; rich countries pitched in to help the poor of the planet adapt to the changes already set in motion. As much future suffering as could be avoided was avoided, and future generations looked back on this massive effort with a mixture of gratitude and something like awe.

This is just a fantasy. The point is that it could have happened but didn't. What future generations will make of us, given what we actually have done, almost does not bear contemplating. Thinking about their judgement, though, can focus our attention on the importance of being as careful as we can be to do what's morally right in the time we now have.

CRITERIA OF MORAL ADEQUACY

Proposals for action can be evaluated in a number of ways. Much depends on what you think matters most. It might be said that a proposal is adequate in practice, that is to say that it will get the job done given certain realities. Maybe a proposal is adequate given particular economic facts or principles: it's affordable or gives us good value for money. Proposals might be called other things besides – they might be efficient or workable, maybe manageable, even politically desirable or generally expedient. What interests us, though, is the moral adequacy of proposals for addressing climate change. Given our earlier reflections in Chapter 3, we can put three criteria on the table immediately. A morally adequate proposal must take due account of:

- (1) historical responsibilities,
- (2) present capacities, and
- (3) sustainability.

To these we can add something new, (4) procedural fairness, which we will come to in a moment. The suggestion is that any proposal for action on climate change must at least satisfy each of these four moral requirements. Other moral demands are possible, but we can say with some confidence that a proposal is morally inadequate if fails to take any of these four things seriously. It won't hurt to think about each one for a moment.

First, there is a clear sense in which some countries bear more responsibility than others for our changing climate. It is a straightforward fact that some countries have emitted more greenhouse gases – used up more of the planet's sinks, caused more climate change – than others. It's a quantifiable fact: we know something about cumulative emissions. This fact can be coupled with a number of premises, of the sort already considered, and the result is the view that the burdens associated with adaptation and mitigation should be distributed in line with what we know about past emissions. Thoughts about justice, about the Polluter Pays Principle, the connections between causal and moral responsibility and so on, all issue in the thought that the developed world has extra duties, deeper responsibilities and more obligations – put it however you like – when it comes to action on climate change.

Second, we know that present emissions are unequal – again the developed, rich world is emitting far more than the developing world. I have per capita emissions in mind, but the developed world will still emit more than the more populous developing world by other measures for a while yet. Fairness, perhaps some conception of rights or equal entitlements, the importance of subsistence emissions, all of these things point towards the conclusion that a finite and precious resource should be distributed equally unless we have some morally relevant criteria for departing from equality. We also know something about the varying capacities of the rich and the poor on the planet. Both of these sets of facts about the present support the conclusion that the developed world should take on

a proportionally much greater share of the burdens associated with adaptation and mitigation.

Third, there is something to be said for reflection on the rights of future people, stewardship or the general fact that the lives of future people ought to matter to us. The demands of sustainability fall upon all countries equally. If our interest now is in particular proposals for action, we need to consider sustainable levels of greenhouse-gas emissions, if there is such a thing. We have managed to avoid the particulars of our obligations to the future so far, but the rationale for morally adequate action on climate change will have to take them up in detail. In a sense it is this criterion which constrains the others. Only after a case has been made for the claim that some level of emissions or other is sustainable can we go on to talk about the just or fair division of those emissions. This case will depend on at least two things: our best scientific thinking about the climate; and our values, in particular, the value of lives to us.

You can spot the relevant empirical part of a proposal for action by looking for talk of targets for levels of greenhouse gases and temperature. Before the Industrial Revolution, carbon-dioxide levels were around 280 parts per million (ppm). Levels passed 380 ppm in 2005 and about 2 ppm are added each year. The rate of the rise is increasing too.¹ The relationship between carbon dioxide in the atmosphere and temperature is certainly worth knowing. A measure of the temperature increase associated with a new equilibrium state if the carbon dioxide in the atmosphere doubles as compared to pre-industrial levels is called 'climate sensitivity'. Coupled with measurements of the amount of carbon dioxide actually in the atmosphere, it can give us a sense of the timing of climate change, among other things. Efforts to calculate climate sensitivity therefore get a lot of attention. The best guess at present is in the range of 2 to 4.5 degrees.² Proposals for action will have to set specific targets in the light of all of this – perhaps in terms of upper limits to temperature increases or levels of carbon dioxide in the atmosphere – anchored in our

clearest understanding of the climate. Other sorts of targets are possible too, but some sorts of precise aims are certainly required.³

There is no shortage of limits, targets and proposals. At present they seem to cluster around 60–80 per cent reductions of 1990 greenhouse-gas levels by the middle of the century. The UK government thinks it should aim to reduce its emissions to 60 per cent of 1990 levels by 2050. The Pew Center on Global Climate Change argues for cuts of 60 to 80 per cent by 2050.⁴ The Global Commons Institute puts the upper limit of carbon dioxide at 450 ppm, arguing reductions of 80 per cent are needed by 2050.⁵ The 2 degree limit is also mentioned in many calls for action at the moment. Certainly the IPCC maintains that increases in globally averaged temperatures above 1.5–2.5 degrees are associated with more rapid warming and more 'negative impacts'.⁶

Recent books have certainly latched on to the 2 degree limit too. Lynas argues that any temperature rise above 2 degrees triggers a feedback in the Earth's natural carbon cycle which puts more carbon dioxide in the air and pushes us past 3 degrees, which will melt permafrost and put enough methane in the atmosphere to get us past 4 degrees, which stands a good chance of releasing even more methane from the oceans, which pushes us past 5 degrees, which is more or less curtains for most life on Earth. This means, he argues, that global emissions have to peak no later than 2015 and fall off quickly thereafter, stabilizing at no more than 400 ppm.⁷ It's a tall order. Monbiot argues that a monumental 90 per cent cut is required in the emissions output of industrial countries by 2030 – a staggering and swift change, although he goes on to argue that it is possible.⁸ The hope again is partly to keep the change under 2 degrees.

Just what the targets should be is, obviously, a matter for further reflection at the moment, largely because we have only a partial grip on feedback mechanisms, sinks, clouds and such. However, there is no doubt that the cuts required are substantial and that they ought to be implemented as quickly as possible.

We may not know exactly where emissions levels should be, but it's clear that present levels are far too high. The scientific aspect of any proposal for action will only satisfy the sustainability criterion if it manages to make a compelling case for the cuts or targets it advocates, in line with our best understanding of the climate system.

The part of the proposal having to do with the value of lives is sometimes couched in terms of risk. The more emissions we allow, the warmer the world gets, and the larger the risk of danger to us and to those who come after us. The acceptable level of risk depends on lots of things, but certainly it depends largely on how much future people matter to us. If they don't matter, then we are not risking much by allowing emissions levels to rise. The part of the demand for sustainability having to do with value says that they ought to matter a lot, and at the very least proposals should assure us that the action advocated does not put them in unnecessary danger. What's acceptable or necessary, what's worth the risk and why, should be spelled out by the proposal in question. We should get a compelling justification for the values embedded in its conclusion.

Finally, morally adequate proposals must be the result of fair procedures. Different accounts of procedural justice or fairness require different things, but at minimum certain sorts of elements almost have to be in place before an agreement even stands a chance of being fair. All parties to the agreement should have an equal share in the information relevant to a decision and an adequate understanding of the facts. The process of arriving at agreement itself should be an open and transparent one. There should be a kind of freedom built into the process which ensures that no one is forced to consent. Certainly, parties lumped with burdens ought to know exactly what they are getting themselves into, and they ought to get themselves into it freely – obviously they have a fair say and participate fully in the proceedings. In short, no one takes advantage of anyone else; the wool is not pulled over anyone's eyes.

UNFCCC AND KYOTO

What has the world actually done about climate change? Given the criteria sketched above, have the efforts of governments been morally adequate?

In 1992, two years after the IPCC's first report, world leaders met in Rio de Janeiro for what came to be known as the Earth Summit. An agreement called 'The UN Framework Convention on Climate Change' (UNFCCC) was put on the table and eventually signed and ratified by nearly 200 countries. The principles operative in the convention are interesting and familiar.

For example, the UNFCCC begins by acknowledging the fact of climate change and the human role in it. Then, a third of the way down the first page, the convention explicitly recognizes that

the largest share of historical and current global emissions of greenhouse gases has originated in developed countries, that per capital emissions in developing countries are still relatively low and that the share of global emissions originating in developing countries will grow to meet their social and developmental needs. . .⁹

This is impressive, in a way, because it amounts to the recognition of some of the premises which we needed in two arguments for the conclusion that the developed world has larger responsibilities for action on climate change than developing countries.

In fact, something very near this conclusion appears just a few lines down: climate change calls for co-operation and participation by all countries 'in accordance with their common but differentiated responsibilities and respective capabilities and their social and economic conditions'. It goes on, recognizing 'the need for developed countries to take immediate action'. The developed world 'should take the lead in combating climate change' while leaving room for the developing world to develop: 'their energy consumption will need to grow'. These points get made again in the document. It even builds in a version of the precautionary principle: 'The Parties should take precautionary measures to . . . minimize the

causes of climate change and mitigate its adverse effects.' All of this seems to be on its way to meeting the first and second criteria of adequacy.

Even the third criterion is nearly met. The 'ultimate objective' of the UNFCCC is the

stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.

The convention even delivers something of a specific target: countries should voluntarily aim to return to their 1990 levels of greenhouse-gas emissions. There is talk of sustainability too, as well as the importance of future generations, even if there is no specific justification for setting the targets themselves or an accompanying consideration of value.

The real trouble is that none of this is in any way mandatory or binding on the signatories. It's not easy to evaluate a proposal for action on moral grounds if the proposal does not actually commit countries to action. The treaty is only a framework on which hang certain principles. It does not tie any country to targets or deadlines but proposes to work towards such things in the future against a certain background. The UNFCCC's voluntary targets, by the way, did nothing much to curb emissions in the 1990s. By 2000, for example, US greenhouse-gas emissions were up by 14 per cent compared to 1990 levels.¹⁰ Kyoto is the actual effort, the attempt to do something, to place binding targets on countries. Although the UNFCCC is on its way to meeting the criteria of moral adequacy, we'll have to have a look at the Kyoto Protocol if what interests us is the moral value of the world's efforts on climate change.

Since the ratification of the UNFCCC, there have been annual Conferences of the Parties of the Convention. The Kyoto Protocol

was tabled at the third Conference in 1997. The mechanisms of the treaty are such that it could only come into force if it were ratified by at least 55 industrialized countries, including countries undergoing the process of transition to a market economy, together accounting for at least 55 per cent of the total greenhouse gas emissions for 1990. Australia and the US famously refused to ratify the treaty. Given the figure of 55 per cent and their enormous emissions, Kyoto nearly collapsed when they walked out. In 1997 the US Congress voted against ratifying anything produced by the UN which did not place binding emissions cuts on developing countries, and we have also seen that the Bush administration argued against Kyoto too. When Russia finally ratified the treaty, enough countries were on board, and Kyoto finally became law in February 2005.

Kyoto does several things. Importantly, it places specific emissions targets on participating countries. The overall goal is to reduce emissions by at least 5 per cent below 1990 levels of the countries taking part, and each country has its own target. For example, Japan is to aim for a 6 per cent reduction; many Eastern European countries have targets of 8 per cent; some countries, like Norway and Iceland, are permitted to increase emissions; other countries are expected to maintain 1990 levels. The EU decided to club together and aim for 8 per cent reductions as a unit, enabling some countries to miss their targets while others pick up the slack.

Kyoto sets a timetable too: targets must be reached between 2008 and 2012. It also allows for emissions trading: if a country misses its target, it can buy allowances from another country which is doing better than required. Developed countries can also earn emissions credits by paying for green projects in developing countries (the Clean Development Mechanism) or by helping another developed country reduce its emissions (the Joint Implementation Projects). All the while, the developing countries are expected to make preparations to join in future rounds of emissions cuts.

Ask yourself if all of this satisfies the criteria of moral adequacy. You might expect a morally adequate treaty to place heavy demands for emissions reductions on those most responsible for

climate change, as well as further demands on those presently best-positioned to take action. Present emissions might be nudged nearer equality with additional reductions placed on those currently emitting most. The rationale for action would couple a scientific justification with a moral one, both of which take seriously the needs and lives of future people. The process underpinning the entire agreement would be a fair one.

Did Kyoto do some or any or all of this? Perhaps the best way to answer this question is to consider the targets specified by Kyoto. The individual targets themselves are not based on principles having to do with responsibility, entitlements, present capacities, or sustainability, but on what many have called 'horse trading'.

Before pulling out of the treaty entirely, the US and Australia fought hard to weaken the treaty. For example, rather than agree to reduce emissions outright, they lobbied to have their forests or forestry conservation projects count against their emissions targets.¹¹ In the end, concessions made to Australia would have enabled it to increase its emissions by 8 per cent had it ratified the treaty. The EU won the right to function as a single entity, with a joint emissions target of 8 per cent, no doubt knowing that this target would be all the easier with the inclusion of Eastern European countries whose emissions were falling in line with their troubled economies. After 1990, Russia's emissions also plummeted – below its 1990 levels – along with its fragmenting economy, and it seems likely that Russia signed up knowing it could make a lot of cash by trading emissions allowances to countries unable to reach their objectives so late in the day. The individual targets set for countries in Kyoto are based on self-interest, not moral principle, certainly not in the recognition of past injustices or present inequalities.

Add to this a little reflection on the sustainability requirement in both its scientific and moral aspects. The Kyoto Protocol offers no scientific or moral rationale for its 5 per cent target. The target is, anyway, not at all easy to justify on either sort of grounds. It is

ludicrously small compared to the enormous cuts endorsed by just about any serious agency you like – as we have seen, cuts of 60 to 80 per cent on 1990 levels by 2050 is in line with plenty of thinking. Some say larger cuts are needed even before the middle of the century. The risk to human beings associated with Kyoto's small target suggests that concern for the value of life had little to do with its formulation. Even if you squint, it is difficult to see how the Kyoto target could make sense from any reasonable understanding of climate science or decent conception of the value of human life. The target is without scientific or moral justification.

Think now of the fourth criterion, the one having to do with procedural justice. It's clear that the procedures underpinning the agreement are wanting, not just or fair. I'm not thinking now of horse trading but of the fact that there were no measures to ensure the equality of the players in the process insofar as the process itself is concerned. Probably the wealthy, industrialized world recognized its many advantages and used them to secure further advantages – no doubt at the expense of weaker countries. The word 'bullying' has been used, and other words might occur to you. A process certainly cannot be called 'just' if those landed with large burdens have little say in the process. There is a sense in which the poor and the weak, those least able to adapt to climate change, were landed with the worst of the burdens: rising tides, drought, failing crops, more disease, water shortages, and on and on. That fact should have secured certain countries a much larger role in negotiations. It didn't.¹²

Hold on, you might think. Maybe Kyoto is morally lacking, but we have to start somewhere. It has been argued that a first step towards something worthwhile, even a tiny first step, is justification enough. Agreement was needed to get the required number of industrialized countries on board for Kyoto to come into force. We should look away from the moral failings underpinning that agreement, because the agreement is worth it. We now have a framework for emissions cuts. We have proved that it can be done,

that the world can work together on climate change. Maybe the ends justify the means.¹³

There are a number of traditions which are willing to say that sometimes the ends justify the means. It is possible to excuse a morally dubious act if the act itself results in something worth having which couldn't have been had otherwise. The excuse, then, has two parts: the thing secured, the end, is worth having and the means is the only way to get it. Sometimes there is a third component: the means cannot be all that bad. No one thinks mass murder might be justified by some worthy end. Other components can be fitted in too.

To buy into this sort of view of Kyoto – that Kyoto is a means to an end worth having – at the very least you have to think that the desired end is now on the cards. You have to think that future rounds of deeper cuts with more industrialized countries taking part now stands a good chance of being a reality because of Kyoto. Further, you have to have good reasons for this thought; it can't just be wishful thinking. Otherwise Kyoto ends up being nothing more than a morally inadequate action undertaken in the barest hope that something good might come of it. You need more than hope if your excuse is to hold water. It also has to be true that your dubious means are the only way to secure the good end you want. It has to be true that Kyoto was the only way to secure the future good end of a meaningful treaty with substantial and binding emissions cuts. There is at least one other way to get such a treaty, and that's to start with it. Finally, you have to be sure that Kyoto is not that bad a thing, but it might be true that Kyoto amounts to nearly 20 years of merely gesturing towards meaningful cuts, and maybe this is a fairly enormous wrong – a large harm our governments are doing to present and future people. The governments of the world, you might conclude, could have done a lot better than they in fact did. Maybe in this case, the means just cannot be justified.

How might they have done better? What might the world do now? There are a number of possibilities.¹⁴ We need to narrow the field.

We'll ignore a few straight away, given their obvious failure to satisfy the criteria of moral adequacy. Consider, for example, variations on the bold view that the status quo should be preserved.¹⁵ One might argue that past usage confers something like the right to emit. So all countries might well have a reason to reduce emissions, but future allocations should be based on the present proportions of emissions by country. If Cuba is responsible for 1 per cent of present emissions, they ought to have 1 per cent of future emissions, whatever the global reduction might have to be. You might be able to talk yourself into this by thinking of squatters' rights or even a utilitarian muddle having to do with avoiding the pain caused by changing lives accustomed to cushions. You can talk yourself right out of it again by thinking about three things which override such considerations: historical responsibility, present capacities and future human lives. The pain of living without cushions, for example, gets trumped by the pain associated with starving to death.

We'll also ignore some suggestions which might be worth pursuing in other contexts. The criteria we have apply best to full-blown, comprehensive proposals for action on climate change, so that's what we'll consider. There are other things floating around too, policy suggestions and pitches for dealing with some specific part of negotiations on climate change.¹⁶ Such things might be judged against a subset of the criteria for moral adequacy, or we might think it best to use them all.

We'll also look away from other proposals, mixed proposals which contain elements emphasizing more than one sort of approach.

We'll consider just two sorts of proposal, arguably two large types which encompass a lot of the proposals going. The first seems to satisfy the criteria of adequacy; the second doesn't but makes a case for not doing so. You can also think of these two types as emphasizing two things which might be of equal importance anyway: emissions entitlements as against the burdens associated with action on climate change. The contrast might help us to see the proposals more clearly, and also get us close to the

centre of at least one large dilemma associated with climate-change negotiations. It might be the largest dilemma. I have no doubt that there are other proposals with moral criteria in mind, but we'll start with and stick to a consideration of equal per capita shares, as it seems to tick most of our boxes.¹⁷

EQUAL PER CAPITA SHARES

Probably the most obvious solution to the problem of emissions allocation is also the one most likely to jive with an ordinary sense of justice or fairness. Start with the truth that the planet's capacity to absorb greenhouse-gas emissions is limited. If there actually is a level of emissions which we think the planet can handle without unnecessary danger, then emissions corresponding to that level ought to be shared out equally. Everybody should have an equal slice of the planetary pie.

Singer, for example, argues that we might try just to stabilize emissions at present levels. At the time of writing, he maintains that this works out to about one metric ton of carbon emissions per person per year. 'This therefore becomes the basic equitable entitlement for every human being on this planet.'¹⁸ Comparing this ration with actual per capita emissions, Singer goes on to show that countries in the developing world have room to grow, to increase emissions, as the current average there is around 0.6 tons per capita. China, for example, could increase emissions by as much as 33 per cent. The developed world, however, would need to make large cuts. The US would have to cut emissions to about one-fifth of its present levels.

Many wrinkles show up quickly, and they can lead to changes or additions to the equal per capita proposal. In Singer's version, the developing world might 'generously overlook the past' and agree to focus just on present per capita shares. In doing this, Singer aims to make the proposal at least slightly palatable to the governments of rich countries, and we'll come back to this thought in

a moment. But if you are persuaded that the first criterion of moral adequacy matters, you might insist on historical responsibility playing some part. Singer himself thinks about this a little, arguing that taking into account some backward-looking principle, such as an historical principle of justice or the notion that polluters should pay for pollution, leaves the developed world with much less than equal per capita shares. Given the probability that dangerous anthropogenic climate change is already underway, it might well be that historical considerations issue in the conclusion that the developed world has already used up more than its share of the sinks. It is not entitled to further emissions at all.

Here we bump into a particularly difficult question. How can we translate differing sorts or amounts of responsibility into aspects of an equitable proposal for the allocation of emissions?¹⁹ If we interpret historical demands in such a way that they can only be met by having a direct bearing on emissions allocations, then we might be left with something awful: the insistence that the developed world is not entitled even to subsistence emissions, that it is somehow right that people in the developed world die rather than use more of the planet's resources.²⁰ Maybe this is a *reductio* of at least some sorts of direct interpretations of historical responsibility. In other words, if direct interpretations issue in this intolerable conclusion, then there must be something wrong with them. What's needed, probably, is some sort of indirect linkage, and the usual suggestion has to do with money.

Here's a cartoon version for you. Perhaps a figure is put on the cost of mitigation strategies needed in the developing world, and the contributions of developed countries are based on their respective cumulative emissions somehow coupled with their present abilities to pay. Perhaps a fund is also set aside for disaster relief, housing, medical aid and so on which might go towards adaptation costs in the developing world. Again, probably contributions are in line with historical responsibility – maybe cumulative emissions totals translate into shares of the costs. The amounts of money involved would no doubt be enormous. In

effect, a lot of the wealth accumulated by the rich countries on the back of greenhouse-gas emissions would now flow to poor countries, among them those who will suffer most as a result of the emissions themselves. It's an indirect linkage, but possibly a just one.

If you think a little about the second criterion for moral adequacy – the one concerned with present capacities – a number of practical problems with the per capita solution might occur to you. Probably people in different countries need emissions for different things. Some of this 'need' is bogus, but I have in mind needs like those associated with accidents of geography. Subsistence emissions, in other words, are not equal across the board. The average Norwegian might need more emissions shares than the average American, because Norway is colder in the winter, and without heat lots of people would freeze to death. Maybe emissions shares go further in a country which has the cash to spend on increased efficiency. It's also true that people in one country might use up emissions shares by producing things for people in another – sometimes one country produces and sells energy to another. Perhaps the cost associated with the emissions lost can be built into the final costs of goods.

Another practical wrinkle can show up just as quickly. If we agree that emissions allocations should be based on numbers of people, we effectively encourage something which compounds our problems on Earth: population growth. Solutions have been suggested; in particular, we might tie allocations to population figures for a specific time. Singer, for example, argues that per capita allocations should be based on estimates of a country's population in the future, to avoid penalizing countries with young populations. No matter how you come down on all of this, equal per capita allocations might not be as simple as they sound.

You might also encounter a theoretical problem in this connection, something associated with a duty to aid the least well-off. Rawls, for example, argues that we might have good grounds for departing from an equal distribution of resources if we hope to

help the worst-off.²¹ In fact, we might have a general duty to help the worst-off, and if you put a lot of weight behind it you might think that equal per capita shares of emissions, although apparently equitable, actually result in a kind of moral error. You might think that any distribution which leaves the rich rich and the poor poor cannot be justified, even an equal per capita distribution. Until other inequalities are addressed, opting for simply equal emissions allocations is itself somehow wrong.

To be sure, these wrinkles and worries are not knock-down objections. The equal per capita option is certainly a live possibility. One of the most attractive versions is called 'Contraction and Convergence' (C&C), and it rightly receives a lot of attention.²² As the name suggests, C&C is a model with two parts. The governments of the world begin by reaching agreement on some particular greenhouse-gas target: some global limit to emissions and a date when this limit must be reached. C&C can then determine how quickly current emissions must contract in order to achieve the target. On the way to the target date, global emissions converge to equal per capita shares.

The moral adequacy of this particular proposal depends on how its parts are cashed out. The Global Commons Institute, the largest advocate of C&C, makes a point of emphasizing what we have been calling the sustainability criterion: the greenhouse-gas budget we opt for ought to be tied to our best current scientific thinking, and it ought to be extremely risk-adverse. A large emphasis is not placed on historical responsibility, but certainly C&C requires larger burdens for faster and more substantial reductions on the part of developed countries. It does satisfy at least a large part of the present capacities and entitlements criterion, most obviously because it aims towards equal per capita emissions, but also because it allows for emissions trading. Whatever else it might do, emissions trading tends to narrow the gap between the rich and the poor. Finally, C&C is at least a long way down the road to procedural fairness. Rooted as it is in the notion that everyone has equal access to the atmosphere, there's just no room for either

horse trading or bullying. From a moral point of view, C&C has a great deal to recommend it.

COMPARABLE BURDENS

The thought that some concessions might be made to developed countries, just to get them on board, has already surfaced twice. We've seen it as a possible reply to the moral failings of Kyoto. Singer also suggests that developing countries might generously overlook the past, and it seems likely that selective attention of this sort is undertaken in the hope that the rich might agree to per capita shares. I've argued that this sort of thing does not excuse Kyoto, but nothing I said earlier rules out the possibility that concessions of a kind might be worth it from a moral standpoint. The reason, and the trouble, is that moral demands can sometimes come into conflict.

Nothing would be easier than simply setting aside proposals which are somehow morally inadequate, but probably that's just too quick. There is a conceptual untidiness in some honest reflection about the right thing to do, and it can force us to think hard about how we rank our values. Some cases are easier than others. If an axe-murder comes to your door and insists on borrowing your axe, should you lie and say you don't have one? It doesn't take much thinking to come to the conclusion that truthfulness matters, but human lives matter more. Lie away. In these circumstances, it's the right thing to do.

If large parts of the developed world won't agree to action on climate change unless historical emissions are largely ignored, is it right to ignore them? Note that this is not a question about practicality or 'what's realistic', but a moral question about the right thing to do. As we have seen, moral considerations can trump all sorts of economic and practical considerations. What we are worrying about now is whether there is a moral reason for ignoring past inequities. There might turn out to be conflict between two

of our criteria: historical responsibility and sustainability. How should we rank them?

There are principles underpinning both, and thinking a little about them can help. Thoughts about historical responsibility depend on such things as the Polluter Pays Principle, as well as the connection between causal and moral responsibility which we paraphrased in Chapter 3 as: 'if you broke it, you bought it'. Thoughts about sustainability are shored up by the value of very many present and a lot more future human lives. This latter value, it seems to me, matters more than moral or causal accountability. It's an awful choice, but if it were the only way to get a firm and meaningful commitment from the world's largest polluters, should we make it?

This line of thinking can lead to the view that our emphasis should be on something other than equal per capita shares of emissions, something which would not place all or almost all of the burdens on the richer nations of the world. Instead, we might consider pushing for something more palatable to the rich: equal marginal costs, comparable burdens, or a fair division of the chores associated with dealing with changes to our climate and altering our energy use.

Traxler sees the problem of climate change as a commons problem, which, as we have seen, is characterized by strong motivations against co-operation to achieve a common goal. The incentive to act selfishly might be reduced, co-operation might become more likely, if everyone sees that everyone else is contributing equally towards a shared end. This can be achieved if the chores required for the end are divvied up fairly. Equally burdensome shares, for Traxler, are defined in terms of opportunity costs. Opportunity costs, he argues, 'measure the difference in returns (to the country in question) of using its resources to deal with climate change rather than of using them in other, presumably more remunerative or beneficial ways. This is the burden a country shoulders: the opportunity for improvement it misses.'²³ So each nation's share of the burdens associated with action on climate change is

equally painful for each nation, even though the costs themselves in monetary terms might be quite different.

There are three advantages to this proposal, according to Traxler. First, because the view ignores past injustices, it avoids recrimination and ill will; it therefore stands a solid chance of leading to agreement. Further, he argues that if we were to take account of the histories of emissions and translate those histories into allocations, we'd have to have broad agreement on what constitutes international distributive justice. He doubts 'that such an agreement is likely in our lifetime' and therefore concludes that taking history seriously amounts to putting off action on climate change indefinitely.

If that were true, then we would have a glaring conflict between historical responsibility and sustainability, but as Gardiner points out, persuasively, there's really no reason to think that a complete analysis of international justice is required before negotiations can begin or cuts can be implemented.²⁴ It is also possible to wonder whether ignoring history is likely to avoid ill will, as Traxler suggests, or lead straight to it. There might be a lot of ill will, most notably in Brazil, if we choose to ignore the past. Some compromise might be required, but why force it in favour of the rich?

Second, Traxler argues that the notion of fair chores can provide a kind of background assumption in favour of fairness as such. It might help weaker nations get a better deal, because everyone can see, from the outset, the unfairness of other bargaining outcomes. However, it almost goes without saying that four other criteria of moral adequacy would do much the same – maybe they'd do better. Certainly they too would provide a framework for securing a fair deal for all. Furthermore, if helping weaker nations matters, if that's partly what recommends fair chores, then the importance of historical emissions matters too, doesn't it?

Third, and most importantly for Traxler and for us, fair chore division gives each nation no stronger reason to defect from the co-operative effort than any other nation. This, he argues, 'would place the most moral pressure possible on each nation to do its

part'. If everyone has equally painful burdens to cope with, and everyone can see that everyone else has equally painful burdens, then defection is much less likely than would be the case if, say, the rich were forced to take huge cuts while the poor continued to emit willy-nilly. The policy of fair chore division, Traxler admits, 'remains morally problematic for neglecting past iniquities', but it 'best promotes international co-operation'.

What do you do with that thought? Let's put aside the possibility that Traxler is wrong about fair chores being the best chance for international co-operation and assume for the sake of argument that he's right.²⁵ Suppose it were true that a morally problematic agreement is the best hope for meaningful action on climate change. You don't need to do too much supposing. It's entirely possible that the US might have signed up to Kyoto if the developing world had agreed to something morally problematic, namely immediate and binding emissions cuts. The powerful nations of the world really did insist on Kyoto targets which had nothing to do with sustainability or responsibility or present capacities. What if it turns out that the only way to achieve international co-operation is to settle for a morally problematic agreement?

As I said before, if there is a conflict between sustainability and the other criteria, in this case historical responsibility, I get the feeling that sustainability wins. I don't have a knock-down argument for this conclusion, but what bothers me is what you get if you deny it. Suppose, instead, that we say that the right thing to do is to hold on to principle, even if it means that we end up with no agreement for meaningful action on climate change. Maybe this stand is admirable, until you think a little about the people who are going to suffer for it, those who come after us and into an unsustainable world, as well as those who are already suffering now and might have some relief through even a problematic deal. You can die for your own principles, if you like, but can you really insist that others die for them, too?

There might be a way out of this, but it's hard to find a way to be happy about it. The reason negotiators might have to settle for

less than a morally satisfactory agreement has something to do with worries about defection. Traxler, for example, argues that the problem of allocating the costs associated with climate change is compounded by the fact that there is no policing body, no supra-national authority which might ensure compliance. Fair chore division, he says, 'best promotes international co-operation in the absence of such an overseeing authority'. If governments had to stick to agreements, had to honour obligations, had to recognize moral responsibilities, then maybe we wouldn't have to settle for morally dubious agreements. Perhaps recalcitrant governments can be forced into compliance. If a government does not find moral demands too demanding, then you can end up thinking that Hobbes was right: covenants without the sword are but words. What's needed is force.

Sanctions are one sort of sword sometimes brought up in this connection – there are others, much worse and more problematic, which we'll ignore here. Singer notes that countries have got together in the past, through the mechanisms of the UN, and imposed sanctions on a country precisely because it did or continued to do something unethical.²⁶ There are trade embargoes, divestments, various forms of cultural boycotting and other, nearby sorts of protest. Singer's example is South Africa under apartheid. Many people agree that sanctions against South Africa were certainly warranted. Given this, the point Singer makes is striking:

Arguably, the case for sanctions against a nation that is causing harm, often fatal, to the citizens of other countries is even stronger than the case for sanctions against a country like South Africa under apartheid, since that government, iniquitous as its policies were, was not a threat to other countries.

If sanctions against South Africa were deemed appropriate, the case for sanctions against a country which does not face up to its responsibilities with regard to climate change is even greater. South Africa harmed only its own people. A country which ignores

the demands of sustainability has a share in the harm of people all over the world, has a share in the droughts and crop failures, the fate of people starving to death right now and in the future. It might not be going too far to suggest that sanctions are not only warranted, but also demanded.

Efforts within a country which behaves unethically, measures undertaken by that country's citizens, are a kind of sword too.