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PHILOSOPHY IN THE IPCC

John Broome

The IPCC

The Intergovernmental Panel on Climate Change (IPCC)[1] is a United Nations body that was created in 1988. Its purpose is to review and assess the science of climate change. The IPCC's First Assessment Report published in 1990 was instrumental in creating a treaty, the United Nations Framework Convention on Climate Change (UNFCCC), in 1992. Since then the IPCC has produced a sequence of reports that have informed the UNFCCC's development. The Fifth Assessment Report (AR5) was timed to come out in 2014 to provide the scientific background for the UNFCCC's 2015 meeting in Paris, at which the widely-acclaimed Paris Agreement was adopted. Because of their authoritative nature and their connection with the UNFCCC, the IPCC's assessment reports are very influential.

AR5 was the first report in which the IPCC included philosophers as 'lead authors.' There were two among more than 800 lead authors. I was one and the other was Lukas Meyer. This chapter recounts my experiences in bringing philosophy to the IPCC and the battle to get philosophical issues connected with climate change well represented in the report. I learned a few lessons that I hope may be useful to other philosophers working in the public domain.

The Labor

It was, first of all, a grueling experience over three and a half years. I attended a dozen meetings of authors, many of which lasted a week or even longer. I went to meetings in Lima, Changwon (South Korea), Wellington (New Zealand),

Addis Ababa, and Kuala Lumpur, as well as many in Europe. You might wonder why the IPCC sends hundreds of people to distant parts of the world, emitting tons of greenhouse gases on the way. The answer, as I understand it, is that the IPCC has little money of its own. It depends on the generosity of governments to pay for meetings, and therefore goes where it is invited. The travel expenses of most lead authors are paid by their own governments. The British government paid for my travel and offset my emissions. Oxford University gave me some relief from teaching, and I raised a little funding for a research assistant. No author receives any pay.

We produced three drafts of the main report before the final version. This report is huge—over five million words. Each draft was sent to many commentators—both academics and governments. We received over 140,000 comments. We were required to take note of each one and record what we did about it. I alone dealt with 700 comments.

The authors were divided into three 'working groups,' and each wrote a volume of the report. A subgroup of each working group then wrote summaries of their volume. They wrote a longish 'Technical Summary' and a 'Summary for Policymakers' (SPM) of a few dozen pages. The SPM was discussed and edited at a final 'approval session' with governments, in an extraordinary process that I shall describe.

Finally, after the three working groups had reported, a small group of authors, including me, wrote a *Synthesis Report*, which brought together the work of all three groups. It too went through several drafts, requiring many meetings, and it also had its own SPM and approval session.

Method

The IPCC is led by scientists, and its reports are treated as scientific publications. I was regularly referred to as a scientist; I did not mind. The methods came from science. At our first meeting, we were told we should refer only to papers published in peer-reviewed journals. I said that philosophers sometimes write books. The response was that books could be referred to, so long as the publisher was a reputable university press, because that would mean it was peer-reviewed. I said I might want to cite Aristotle. The response was that it was permissible to cite material that had not been peer-reviewed, but special procedures applied to this 'grey literature' as it was called. The IPCC wanted to hold a copy at its headquarters in Geneva, in case the contents were questioned. I ignored this rule, and no consequences ensued.

To be fair, the IPCC has good reason to be defensive. The Fourth Assessment Report (AR4) contained the incredible prediction that glaciers in the Himalayas would melt by 2035 (IPCC, 2007, section 10.6.2). This one mistake in the 3000 pages of AR4 did not appear in the core scientific volume contributed by Working Group 1. Nevertheless, it drew an extraordinary amount of

criticism when it was discovered. The date of 2035 was taken from an unrefereed publication, and it definitely should not have been.

IPCC reports are supposed simply to review the literature. This is difficult for a philosopher, since our nature is to make arguments rather than report what people have said. I ended up reviewing the subject rather than the literature in the subject. I hope this was a good compromise.

Content

Meyer and I were in Working Group 3 (WG3), whose job was to investigate the options for 'mitigation,' which is to say, reducing the degree of global climate change. We were allocated to Chapter 3 of WG3's report: a theoretical chapter entitled 'Social, Economic and Ethical Concepts and Methods.' We found ourselves working with a dozen other authors who were mostly economists. Later, despite protests from me, I was drafted as an author of the summaries of WG3. This meant I attended WG3's approval session in Berlin. I also became an author of the *Synthesis Report* and its SPM. So I saw the AR5 through to its last hurrah at the approval session of the *Synthesis Report* in Copenhagen.

Even before the authors were recruited, the chapter headings of the working groups' reports and even their section headings were set by the IPCC Panel itself, which consists of delegates from the 195 member governments. The Panel evidently intended that we two philosophers should be responsible for just one section entitled 'Justice, Equity and Responsibility.' Until recently, most of the philosophers who work on climate change have been political philosophers. They have tended to concentrate on how the burden of dealing with climate change should be fairly distributed among countries and people. Who is to blame for it, and who should pay for dealing with it? Given political philosophers' traditional interest in justice, it was natural for the climate change community to associate philosophy with the topics of justice, equity, and responsibility.

We do indeed have a lot to say about these topics. But we also have a lot to say about the topic of value, which is equally central to climate change. Part of it is the nature of human wellbeing, and how different people's wellbeing may be aggregated together and weighed against each other. At my request, our working group's leaders managed to persuade the Panel to add a section to our chapter entitled 'Values and Wellbeing.' I took the main responsibility for this section, and Meyer the lead responsibility for 'Justice, Equity and Responsibility.'

In the space I was given in the WG3 report (IPCC, 2014a, sections 3.4 and 3.6.1), I tried to write a primer on value theory, starting from its foundations. In the practical politics of climate change, it is economists who deliver concrete measurements of value. So my primer worked up from first principles to explaining and criticizing economists' measurements.

Each step in this development requires heroic assumptions that set aside huge issues. First, we assume that value as a whole can be broken down into separate values. Then we divide values into human and non-human values, and set aside the non-human values. Among human values we concentrate on the wellbeing of individuals, setting aside communal human values, which cannot be ascribed to individuals separately. Then we make some detailed assumptions about how individual wellbeing comes together to determine an aggregate of wellbeing. At this point I included a section on the ethics of population. Since climate change affects the world's population, population ethics is essential for good judgments about climate change, but until now it had been entirely neglected in the literature of climate change. Finally, we make assumptions that allow us to measure the aggregate of wellbeing in terms of one quantity: money.

To arrive at a credible measure of value in terms of money, quantities of money have to be adjusted to take account of the differing values of money to rich and poor people. Since the time of the great nineteenth-century economist Alfred Marshall (1920, Book 3, Chapter 3), it has been recognized that money is worth less to a rich person than to a poor one because a rich person already has many more of the things money can buy than a poor person has. A rich person has only luxuries to buy, whereas a poor person must buy necessities. Nevertheless, common practice in economic valuation neglects this point. It measures the value of an event or policy in terms of its monetary value overall, making no adjustment for the differing values of money. This common practice is indefensible. Since there is some small chance of correcting it, I stressed this objection in the report. I was even able to carry my objection through to the SPM of WG3, as I shall explain.

Economics has another failing as a means of judging values. It has no way of taking account of non-human values such as the suffering of animals. Economists sometimes assume that the suffering of animals is bad only because it distresses people, so people are willing to pay money to reduce it. This is obviously false, but I am sorry to say I was not able to give this failing much attention in the report.

Cooperation with Economics

One of the lessons I learned through my work on climate change is that philosophy needs to cooperate with other disciplines. Philosophy is immensely influential. Much of the modern world has been built on the thinking of philosophers: science grew out of philosophy, liberalism arose from philosophical thinking, and so on. But philosophy's influence generally propagates slowly. A few lay people read the writings of philosophers and the message gradually filters through to the general public. Philosophy can influence the world's response to climate change, too, but we cannot wait for its usual slow propagation. The problem is too urgent.

Instead, we have to work with a discipline whose influence is more rapid: I mean economics. Economists have the ear of governments and other institutions. And economists share with philosophers an interest in some of the same subjects, including aspects of value theory relevant to climate change. For example, they are interested in the value of preserving human life and the relative values of present and future goods.

Economists have a confused attitude to value. Although they make judgments of value all the time, they often think they should not. Look at the following remark from the *Synthesis Report* of the IPCC's Third Assessment Report, published in 2001. This is the work of natural scientists more than economists, but it reflects a view that is widely held by economists, too:

> Natural, technical, and social sciences can provide essential information and evidence needed for decisions on what constitutes "dangerous anthropogenic interference with the climate system." At the same time, such decisions are value judgments determined through socio-political processes.[2]
>
> *(IPCC, 2001, p. 38)*

So judgments of value are supposed to be determined through 'socio-political processes' rather than by intellectual effort, as other judgments are. The IPCC at that time evidently thought of people's judgments of value as similar to tastes: not to be assessed as right or wrong. Many natural scientists and economists are still in thrall to the logical positivists. Economists who think this way see their work as a sort of democratic aggregation of the value judgments of individuals (see, for example, Weitzman 2007).

But other economists think differently. Compare this passage, which I managed to insert into the recent *Synthesis Report*:

> Decision-making about climate change involves valuation and mediation among diverse values and may be aided by the analytic methods of several normative disciplines. Ethics analyses the different values involved and the relations between them…. Economics and decision analysis provide quantitative methods of valuation which can be used for estimating the social cost of carbon, in cost–benefit and cost-effectiveness analyses, for optimization in integrated models and elsewhere. Economic methods can reflect ethical principles.
>
> *(IPCC, 2014b, pp. 76–77)*

Economics makes ethical claims and must be founded on ethics. The job of economists is to recommend and assess economic policies and actions. They say that governments ought to do this or that, or that this policy is better than that one. 'Ought' and 'better' here can only mean 'ethically ought' and 'ethically better.'

Many economists recognize that economics is founded on ethics. For example, the *Stern Review of the Economics of Climate Change* (Stern, 2007) says so explicitly. These economists are interested in moral philosophy and are willing to work with philosophers. The ethical arm of economics is oddly known as 'welfare economics.' There is no boundary between philosophy and the deeper reaches of welfare economics. For example, the welfare economics of equality and the philosophy of equality merge together. When I started work for the IPCC, I expected to be fighting continual battles with economists. But actually I found the economists I dealt with cooperative. I think it helped that I have a PhD in economics.

When we came to write the SPM, the important affinity between economists and philosophers became increasingly apparent. I found myself in close alliance with economists, and particularly with the philosophically minded economist Marc Fleurbaey. The affinity is that our respective disciplines are each strongly analytical. We aim at tight, sharp argument. We like to say things precisely and demonstrate them rigorously. In writing the summaries for WG3, we came in contact with other social scientists who think differently. Conflicts arose between those who tried to be definite and those who wanted to soften our statements by caveats and qualifications. I like to use each paragraph in a text to say one thing and, if qualifications are needed, to add them separately. An alternative style is to say everything in one paragraph, replete with 'although' and 'perhaps' and other sorts of vagueness. The economists and the philosophers generally favored the first approach, and others the second.

The Chapter

We philosophers got on well with our colleagues in Chapter 3 of the report. This was partly achieved simply by mutual forbearance. I wrote my sections of the report without much interference from other authors, and I did not interfere with theirs. The process of writing started with bidding for space. I thought we did well in the bidding. But now that I count the pages in the report, I see we ended up with only 5 percent of our chapter, which is definitely less than our fair share. I think this must have been the result of prolix writing toward the chapter's end. We philosophers did at least have a prominent place near the beginning, and we wrote concisely.

At one point, the leader of our chapter, Charles Kolstad, tried to abolish private fiefdoms within the chapter. He ruled that each section should be revised by someone who had not written it. My section was revised by one of my economist colleagues, who tolerantly allowed me to revise it all back again later. Nevertheless, the detrimental effect of writing by committee does show in the final result. The prose is not always good, and our chapter is longer than many books. It covers many topics, which are not welded into a coherent structure.

I look enviously on the chapter on discounting that appeared in the IPCC's Second Assessment Report (IPCC, 1996, Chapter 4). It is only four and a half pages long, followed by a longer technical appendix. Those pages set out very neatly a classification of theories of discounting into 'prescriptive' and 'descriptive' theories. This chapter became very well known. It stimulated a renewed interest among economists in the theory of discounting. I do not agree with that chapter's classification of theories. All theories of discounting are prescriptive: they prescribe to governments how they should discount future good. But I wish IPCC reports had remained vehicles for such clear summaries of particular subjects, rather than the monstrous compendiums they have become.

The Summary for Policymakers

Eventually we moved on to summaries. The huge main report of the IPCC attracts relatively few readers. It is the SPMs of the working groups that count. These are only a few dozen pages long, so there is strong competition for space, under the guise of cooperation. In the closing stages of writing the SPM of WG3, drafts circulated among authors by e-mail. Each of us would make changes according to our views. We used Word's facility for 'track changes,' but it was undiplomatic to reverse another author's changes. As changes piled on changes, there would come a time when some author would clear the clutter by accepting all the changes. Then the circulation would start again.

It was important, if possible, to be the last author to make changes before each deadline given us by the secretariat (known as the 'Technical Support Unit' or TSU). That was not easy for someone working in Britain, when there were also authors in the US. Furthermore, our deadlines never seemed final. The TSU would unexpectedly add another few days, so the exhausting process would begin again.

Once, at a meeting about the SPM in Potsdam, we were trying to think of a good opening sentence. I proposed: "Avoiding dangerous interference with the climate system is still possible but will be hard and costly." That is an accurate statement of WG3's conclusions. However, my suggestion was instantly shot down. The grounds were that you simply cannot have a short, sharp statement like that in an IPCC report.

There was a reason for this that I did not fully appreciate at Potsdam. More experienced IPCC authors knew what was coming. The report has to be approved by governments. The main report and its Technical Summary are approved (or not) as a whole. But the SPM is approved 'line by line.' This means that delegates from any of the 195 governments that make up the IPCC can edit or reject anything that the authors write in the SPM. There is therefore no point in including sentences that governments will predictably reject.

It is easier to get vague and uncontentious remarks past the governments. On the other hand, we wanted to tell the whole truth. So the writing of SPM was

an exercise in compromise, which began to be fought out even before the governments saw a draft. Even at that stage the message began to be weakened. Self-censorship was in progress.

It is important to understand that this happened only to the SPM. It is sometimes claimed that the IPCC reports are subject to political influence. But the main reports and the Technical Summary are entirely the work of the authors; the government delegates have no influence on their content. Moreover, delegates cannot insert anything into the SPM that is not validated by authors. However, they can remove content from the SPM. Everything in the SPM has to be accepted by consensus, which gives the delegates the ultimate power of veto. They use it.

Approval

The approval process for the SPM was almost incredible. Until I saw it, I did not believe a report could be edited in detail at a plenary session of hundreds of delegates from across the world. About 120 countries sent delegations, ranging in number from one to more than a dozen. We all gathered in a conference room holding several hundred people in a vast hotel in Berlin. In a way, it was flattering to me as an author to have so many people paying such careful attention to the details of what I had written.

Five days, Monday to Friday, were allocated to approving the SPM. However, Friday was not required to end at the conventional time of midnight. The meeting went into continuous session on Friday morning, with short breaks for meals, and did not stop until more than 24 hours later.

The process relied on someone on the podium who was very adept at typing amendments into text and using track changes. Projected on the screen at any time was a segment of the text, with the particular sentence under discussion highlighted in yellow. The discussion of each sentence continued, and amendments were made, until there was consensus on it among the delegates and authors. Then the chair of the session would bring down his gavel and the highlighting would turn to green. A green sentence was not supposed to be reconsidered. This process continued until the entire SPM had received approval by consensus.

At first I was amazed at the lack of cooperation shown by the delegates. It was plain from the start that it would be very hard to approve the whole SPM in the time available. There was a gauge behind the podium that showed the proportion of words approved compared with the proportion of available time expended. Even by 6:00 p.m. on Friday, when in theory the meeting should have wound up, it showed that only 50 percent of words had been approved. Yet the delegates wasted time and made pointless comments.

On Monday, each delegation that spoke started by saying, "Mr Co-chair, since this is the first time my delegation has spoken at this meeting, I would like

to thank the government of Germany for its generous hospitality, and the authors of the report for their excellent work." When 100 people repeat this formula, it occupies a lot of time. However, it was explained to me that the delegates were deliberately marking time through most of the week because they knew that all the action, and all the dirty work, would be on Friday night.

Opening

There were opening speeches on Monday morning. Christiana Figueres, executive secretary of the UNFCCC, took the trouble to mention that now, for the first time, philosophers were serving as authors of the IPCC.

Business started when co-chair Ottmar Edenhofer projected on the screen for consideration, highlighted in yellow, the first words of the report. These were 'Section 1. Introduction.' Immediately many countries flagged up their desire to comment. They did not really want to object to these words, but they wanted to make a complaint. The governments had been sent a draft of the SPM, and some had sent detailed comments in reply. But after the draft had been sent out, Section 1 and the theoretical Section 2, which I was involved in, had been substantially rewritten by the TSU. I think this was self-censorship again: the TSU had been worried that the beginning of the SPM was too direct and unqualified to be acceptable to governments. So the governments arrived in Berlin and found they had commented on a draft that had been deleted and they were facing a new draft they had not seen before. That made them unhappy.

Section 2 came up toward the end of Monday morning and was immediately in trouble. Largely because of its ethical content, it was perhaps the most controversial section of the SPM. Some countries wanted ethics excluded entirely from the IPCC. I particularly remember an intervention from the UK delegate. He congratulated the authors on having coped so well with the difficulty of introducing broad and complex issues of ethics into the SPM. However, he said, these issues were actually too broad and complex to be fitted into a short report, and he therefore proposed that the ethical parts of the text should be deleted. I am British and I assume (but do not know) that the UK government nominated me as an IPCC author, so this seemed like a stab in the back.

The IPCC chairman, Rajendra Pachauri, soon intervened to send Section 2 to a 'contact group.' We (authors of the section) were sent to another room to hammer out a text with the relatively small number of delegates that chose to join us.

Contact Group

We took three and a half days, from 8:00 a.m. till midnight, to perform our task. In that time, we produced only two pages of the SPM. Through those days,

again and again, we would write a draft, then present it to the contact group, garner comments, and produce another draft.

In the room, the delegates had different styles. The US delegate was constantly on the phone to Washington. The Saudi delegate looked disgruntled and said little. The UK delegate stared at the ceiling. Others shuttled about making deals. Months later, I was shown a comment about me from the diary of a Netherlands' delegate, Arthur Petersen. I think it illustrates how alien the philosophers' deliberative approach to questions can seem to other people:

> Later during the day, when we convene in the evening in the contact group, the philosophy professor has developed a unique modus operandi. He never indicates immediately the adjustments he will propose. He only says that he has listened carefully, has learned much from it, and has to ponder it a bit. He also says he does not master the technique of making a new text in track changes. And so, we get a lecture with a whole new text. Unbelievably, this man seems to get away with it. But he speaks such beautiful English and he really knows what he is talking about. I become a bit milder and I must admit the text has improved somewhat, with less normative terms and more references to the related chapter.

Success

The disagreements in the contact group were between different governments rather than between authors and governments. To a large extent, our role was to mediate the disagreements. True, we could have resolved them easily by emptying the section of content, but we did not want to do that. So we were searching for ways to preserve as much significant content as possible that the different sides could agree to.

Disagreement came to a head on Wednesday night over the most contentious paragraph on justice. At 10:00 p.m. two huddles of delegates formed in corners of the room. One was a group of developing countries (by the UNFCCC's definition) let by Brazil and Saudi Arabia. The other was a group of rich countries led by the US. They were composing their own versions of a paragraph about justice. We, who would become the nominal authors of the paragraph, sat and twiddled our thumbs.

At one time while this was going on, a more senior US delegate from the plenary session visited our room. I overheard him saying to his colleagues "Why don't we just delete this section on ethics and get on with more important stuff?" At 11:00 p.m., we were presented with two alternative versions of the paragraph. We were told that one would be rejected by the developing countries and the other would be rejected by the rich countries. Brazil said to us quietly, "I advise you to stick very closely to our proposed text. There are not

really two options. Only one is possible. We are very close to deciding there will be no Section 2 in the report."

By that time of night I was tired, but this explicit threat galvanized me. It added spice to the occasion, and the possible deletion of our section did not seem to me a bad thing. We would no longer be authors of the SPM. This would leave us free to talk to the press who were camped outside. Figueres drew attention to the presence of philosophy and ethics in AR5, and so did the IPCC's press releases. Any country that deleted our contribution would look bad. It would seem not to care about ethics.

After the threat was issued, Fleurbaey told Brazil that we were thinking of resigning. This made the delegates suddenly more cooperative. They did not really want us to go. Consequently, agreement was reached following some shuttle diplomacy between the two camps the next day, conducted by Fleurbaey and others. By Thursday evening we had consensus on a complete version of the section.

It had still to be agreed upon at the plenary session. It was brought to plenary at 1:20 a.m. on Friday morning. Edenhofer, in the chair, reminded the meeting that, since the whole text had been approved after detailed consideration in a contact group, there should be no reason for any intervention. Nevertheless, when he read the first sentence, Tanzania proposed a perfectly pointless amendment to it. Edenhofer came down on Tanzania so heavily that thereafter there was not a whisper from the room. The whole text was approved without any further objection and was applauded as a result.

We were lucky. Because ours was the first substantive section, we got three and a half days to negotiate a compromise text. By contrast, the next night, in the small hours of Saturday morning, as delegates came under pressure from the need to sleep and to catch their flights home, important parts of the SPM were deleted wholesale. These were sections where no compromise had been achieved. I was shocked to see this destruction. I have told the story of it elsewhere (Broome, 2014).

Ethics in the SPM

My own chief concern in Berlin was just three paragraphs of the SPM that were explicitly about ethics. The SPM contains virtually no other mention of ethics. I reproduce here the version of those paragraphs that finally emerged (the bold headings are in the original):

> **Issues of equity, justice, and fairness arise with respect to mitigation and adaptation.** Countries' past and future contributions to the accumulation of GHGs [greenhouse gases] in the atmosphere are different, and countries also face varying challenges and circumstances, and have different capacities to address mitigation and adaptation. The

evidence suggests that outcomes seen as equitable can lead to more effective cooperation.

Many areas of climate policy-making involve value judgements and ethical considerations. These areas range from the question of how much mitigation is needed to prevent dangerous interference with the climate system to choices among specific policies for mitigation or adaptation. Social, economic and ethical analyses may be used to inform value judgements and may take into account values of various sorts, including human wellbeing, cultural values and non-human values.

Among other methods, economic evaluation is commonly used to inform climate policy design. Practical tools for economic assessment include cost–benefit analysis, cost-effectiveness analysis, multi-criteria analysis and expected utility theory. The limitations of these tools are well-documented. Ethical theories based on social welfare functions imply that distributional weights, which take account of the different value of money to different people, should be applied to monetary measures of benefits and harms. Whereas distributional weighting has not frequently been applied for comparing the effects of climate policies on different people at a single time, it is standard practice, in the form of discounting, for comparing the effects at different times.

(IPCC, 2014a, p. 5)

The first of these paragraphs is the feeble remnant of the disputed paragraph on justice. It is not empty. Indeed it is a major concession on the part of several countries to acknowledge that justice is at stake in determining the different responsibilities of governments toward climate change. It even recognizes that past emissions count, which the US has tried to deny. The second paragraph recognizes that climate change is an ethical matter, and that the academic discipline of ethics can contribute to determining what ought to be done about climate change. These two paragraphs are small beginnings, but it is an advance on the part of the IPCC simply to recognize that philosophical issues and philosophy as a discipline have a place in decision-making about climate change.

The third paragraph is more substantive. It is the one I am most proud of. It went through the contact group without much trouble. Perhaps this is because it is rather technical, and the delegates may not have been clear on what it means. It says that the standard methods of cost–benefit analysis used by economists are not justified by ethical theory. The weighing of costs and benefits should apply 'distributional weights,' which adjust for the different values of money to different people. Costs and benefits are initially measured in money, but money is worth less to rich people than to poor people. So in assessing the value of policies, the money of the rich should be down-weighted. Standardly, economists do not make this adjustment among contemporary people. As the last sentence of the paragraph points out, they do make it between different

times; this is their most common theoretical argument for discounting future goods. So not only is their practice wrong; it is inconsistent.

Recognizing the need for weighting makes a great difference. By and large, the benefits of emitting greenhouse gases accrue mostly to the world's rich and the costs are borne mostly by the poor. The benefits of reducing emissions accrue mostly to the poor and the costs mostly to the rich. In evaluating means of reducing emissions, taking account of the different values of money to different people will shift weight from the costs to the benefits. It promotes the reduction of emissions.

This is scarcely a conclusion of philosophy rather than of good economics, or even of good sense. But the SPM is only a list of points, so it inevitably has no room for substantial philosophy. Remember that, because of the IPCC's extraordinary approval procedure, anything that appears in the SPM has been accepted by every country in the world, or at least by every country that sent delegates to the approval session. So every country has agreed that the standard economists' methods of valuation are mistaken. I think this is notable.

Moreover, the countries took note of it. The words of the SPM acquire a special authority in subsequent international negotiations on climate change. This was brought home to me at the approval session for the *Synthesis Report*, which I attended some months later in Copenhagen. I carried some text from the SPM of WG3 through to the *Synthesis Report*. But because the text was a compromise made in the political atmosphere of the contact group, I was not happy with the prose. I tried to improve it. However, a Saudi delegate in Copenhagen noticed the textual changes and insisted on restoring the original wording, because that was what had been agreed in Berlin. I had my own prose quoted back to me. The Berlin text had acquired an immutable authority.

The *Synthesis Report*

After the Berlin meeting, my work shifted to the *Synthesis Report* and its approval session in Copenhagen. Since I was now working with many natural scientists as well as social scientists, there was less room for philosophy. At the meetings, I saw myself, more than anything else, as an advocate for sensible ideas from outside science.

Here is an example. Traditionally, the IPCC expresses its scientific conclusions in terms of likelihoods: it is extremely likely that human beings have caused observable climate change, it is likely that warming will be less than two degrees if cumulative emissions remain below one trillion tonnes of carbon, and so on. But elementary decision theory, which is not part of science, is that decision-making should not depend on likelihoods alone. The right decision to make is not necessarily the one that is likely to have the best result. For example, a ship should carry lifeboats, even though it is unlikely that they will ever be used to save lives. The reason is that, in the very unlikely event of the

ship's sinking, the result will be dreadfully bad if it has no lifeboats. In determining whether to carry lifeboats, this badness should be discounted by its small probability, but even so it outweighs the cost of the lifeboats. This example is no more than common sense, but decision theory goes further. It tells us that decisions should be based on mathematical expectations of value. The likelihoods stated in IPCC reports are insufficient for good decision-making.

To calculate expectations of value we need to know two further things. First, we need to know whole probability distributions, not just the likelihoods of particular events. For example, we need to know, not just what degree of global warming is likely, but what probability to attach to each degree of global warming that might occur. Second, we need values. For example, we need to know how bad each particular degree of warming would be, were it to occur. This second requisite can be met only by deploying a theory of value, which is in the domain of philosophy and far beyond science. Science can in principle satisfy the first requisite, by determining probability distributions for degrees of warming and other variables. However, full distributions are hard to extract from the available climate data. This explains why distributions did not appear in IPCC reports before AR4.

At *Synthesis Report* meetings I often pressed the point that we need to go beyond likelihoods. And, indeed, the *Synthesis Report* of AR5 recognizes this point, at least to the extent of giving attention to the possibility of unlikely but very bad events. The unlikely possibility that climate change will destroy our civilization may be more important than the less bad consequences that are much more likely, because it would be so very bad (see Weitzman, 2009). The *Synthesis Report* says, "Because risk involves both probability and consequence, it is important to evaluate the widest possible range of impacts, including low-probability, high-consequence impacts that are difficult to simulate" (IPCC, 2014b, p. 58). This is a step forward for the IPCC. I wish I could claim credit for it, but I cannot; the IPCC was taking this step anyway without my pressing it.

On matters of ethics, I carried into the *Synthesis Report* as much as I could from the SPM of WG3. Since this text had already been approved in Berlin, delegates were not able to object to it in Copenhagen. For instance, the SPM of the *Synthesis Report* includes the sentences: "Mitigation and adaptation raise issues of equity, justice and fairness. Many of those most vulnerable to climate change have contributed and contribute little to GHG emissions." What the delegates could do is dilute the messages by inserting anodyne words and sentences. The substance survives in the report, but to find it you have to cut through the dross.

Conclusion: Lessons for Philosophers

I am pleased the IPCC decided to give a small place to philosophy in the AR5. The need for it is obvious to philosophers, but many non-philosophers among the IPCC authors and delegates were puzzled by the presence of philosophers. Indeed, many were unclear what philosophy is.

I was surprised at just how alien the methods of philosophy seemed to many natural and social scientists. They lack our patience with argument. We take it for granted that questions should be thought through with high analytic precision, and we go where the arguments lead us. But they often think we are pointlessly picky about precise meanings and points of logic. For example, many philosophers are concerned about the implications of the nonidentity effect—the fact that changing government policies toward climate change will change the identities of the people who will come into existence in the future. The report of WG3 contains a brief discussion of the relevance of the nonidentity effect for the theory of justice toward future generations. But more than one social scientist took me aside to tell me that no one would take this discussion seriously. They found no fault with the arguments; they just did not want to hear them.

Nevertheless, I think we managed to demonstrate that we have a contribution to make. The SPM of WG3 says that, "Social, economic and ethical analyses may be used to inform value judgements." 'Ethical analyses' are explicitly recognized as useful.

In part, I think we achieved some recognition because I was able to talk easily to economists. It helped a great deal to be able to speak a language that was familiar to my colleagues. I hope this allowed me to bring some accurate, sensible thinking to our discussions—the sort of thinking philosophers are devoted to—quite apart from the small amount of substantive philosophy I was able to introduce.

In sum, as philosophers we think in a different and more concentrated way than other people do. This is exactly why we can make an important contribution. But it sets us apart from our colleagues and gives us a hurdle to overcome. To work effectively in the public domain, we have to find a way of overcoming it.

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Notes

1 I apologize for all the abbreviations I use.
2 The quoted phrase comes from Article 2 of the *United Nations Framework Convention on Climate Change* (1992), which specifies the convention's aim. It says, in part, "The ultimate objective of this Convention … is to achieve … stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."

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