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Review Essay

Precaution, Bioethics and Normative Justification

Daniel Steel: Philosophy and the Precautionary Principle: Science, Evidence and Environmental Policy. Cambridge University Press, Cambridge, 2015, xv + 256 pp., ISBN 978-1-107-07816-1

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In two recent encyclopedia articles on the ethics of the precautionary principle (PP), I have ended with the observation that an initially rather confused philosophical debate on PP (initiated roughly in the later part of the 1990's) has recently begun to mature into a more nuanced and constructive state. No previous work I have encountered illustrates this assessment better than Daniel Steel's new book *Philosophy and the Precautionary Principle: Science Evidence and Environmental Policy* (Steel 2015). Both regarding philosophical depth, overall analysis of the topic, argumentative ambition and the general design of central arguments, it is simply the best general philosophical treatment to date of the notion of precaution in decision- and policy-making. At the same time, this implies that Steel dares to develop enough of argumentative and analytical detail to open up far more distinct gaps for critical wedges to be inserted into than any previous contribution. In this essay, I will highlight a few such points connecting to my own work and ethics and bioethics in general, which to my mind deserve further development. Initially, however, I want to underline that these critical openings are there largely thanks to Steel's thorough footwork in providing greater clarity and structure to the hitherto rather diverse philosophical discussion in this area.

The understanding of precautionary thinking and policies incorporating PP is central to a number of areas in bioethics, from grand issues regarding the handling of risky emerging technologies, over complex questions actualised by the overlap of public health and environmental policy (Resnik 2013), to a number of issues in the research ethics of biomedicine and public health, the closer formulation of clinical ethical virtues in traditional medical professional ethics, and the classic bioethical topic regarding the ethical assessment of emerging technologies (Munthe 2015). In all of these areas, the idea that there are important reasons to *restrain* action in view of more or less uncertain dangers, as well as to *take* action in order to guard against such dangers, as well as to judge to what extent there is

reason to seek better evidence to decide on or go ahead in spite of existing ignorance, all these issues related to varying prospects of benefits and risks, is present though often not made salient. However, how to *justify* and make such ideas *more precise*, as well as understand *how they should be applied* in various types of decision- and policy-making situations is mostly passed over in silence. This is a difference to more general environmental ethics and policy debate, as well as general debates on the philosophy and ethics of technology and related policy (not restricted to the bioethics realm). It is these latter debates that form the starting-point for Steel's work and theoretical endeavour. It is the general idea of a PP to be included as a central tenet in scientifically driven environmental and technology policy that is his main target. Nevertheless, it is obvious that many analyses, arguments and conclusions are highly relevant also for a broad segment of bioethics. Indeed, as recently argued by Per Sandin in an oral address on Steel's book, the notion of precaution is a quite plausible candidate as a fifth mid-level principle to be added to the four famous ones of "the Georgetown mantra" (Sandin 2015), and a similar idea has been pursued by Resnik in the area of ethical issues arising in the intersection of biomedicine, public and environmental health (Resnik 2013).

Currently holding an associate professorship at the Michigan State University philosophy department, Steel's speciality and background is the philosophy of science, on which he has published and co-edited two previous books (Steel 2008, 2011), and this shines through to some extent. Especially in chapters 7 and 8 this special competence provides rich layers of new nuance with regard to the implications of PP for scientific practice and its philosophical underpinnings. However, Steel's general grip on PP is broad, and this inclusive ambition is also a basic quality of the book. The overview of the debate provided in chapter 1 is a definite treat, and may serve as a textbook introduction to the philosophy of PP for quite some time ahead. Steel observes that philosophers have responded to the notion of PP from many angles,

including conceptual analysis, decision theory, epistemology, ethics, political philosophy and philosophy of science, and declares that he will develop an understanding and theory of PP aimed to fuse all of these perspectives. More specifically, his theory is meant to function both as a political procedural requirement, a decision rule and an epistemic standard (applicable to science). This is bold, of course, but also makes for quite a bit of theoretical innovation on Steel's part, although in the end it seems that he is forced to prioritise some angles at the expense of others. Disappointing as this may appear for the bioethically engaged reader, he is in particular discounting the need for normative ethical foundations of his own central claims – especially those regarding politics, decision guidance and the basic reason for exercising precaution – although these parts of the theory are clearly of a normative ethical nature. As I myself made more or less the opposite choice in my own book on PP a few years back (Munthe 2011) – focusing on ethical underpinnings and sacrificing some aspects probably of more interest to a philosopher of science or a decision theorist – I have nevertheless found this gap in Steel's construction stimulating; sensing exciting opportunities for forthcoming work aiming at synthesis. My contention is that this attraction should be shared also by the more general bioethics scholar community, and this essay has been written in order to explicate and motivate that claim.

Steel's general grasp of his topic comes from his basic understanding of the philosophical debate on PP to be revolving around what he calls "the dilemma objection" (or DO), focused on in chapter 2. Attached to DO are auxiliary challenges about making PP fit allegedly necessary frames from decision theory, politics and science (chapters 3, 4, 5, 6, 7). Steel successfully challenges many of these familiar critical themes from the earlier debates, and also disposes of a number of suggestions made over the years to force PP into a costume where it will not challenge any orthodoxy in decision theory, risk analysis or philosophy of

science. Particularly original contributions, besides the overview in chapter 1 and the discussion of DO, are the way in which Steel connects the PP debate to the issue of the evaluation of risks to distant future generations (chapter 6), and to epistemic and scientific ideals (chapters 7 and 8). In the final chapter, Steel applies his variant of PP to the cases of climate change policy, a particular example of GMO for food production, and general regulation on chemicals in the European Union. These are analogous to many other cases that should attract a lot of interest from bioethicists, such as pharmacological testing regulation, and germ line gene therapy and other biotechnological avant garde technology, e.g. in neuroscience. In addition, a number of appendices set out in detail some specific points in a more formalised manner, among these Steel's reading of how two elements of my own theory fit into his own conception.

The treatment of DO in chapter 2, is the backbone of the rest of the book, and resolves into the exoskeleton of Steel's theory, then fleshed out with regard to selected sub-topics in later chapters. The *dilemma* of the DO is the accusation that PP is either "empty" or "trivial" or equivalent to already well-known ideals of decision-making, or blatantly implausible, self-defeating or even self-contradictory. The first horn of this dilemma is handled through the "meta" PP, MPP, which captures an idea that Gardiner (2006) has called a "weak" and Sandin (2004) an "argumentative" PP, stating that policy measures in light of possible threats may be justified in spite of lack of full scientific evidence. Steel demonstrates that MPP conflicts with existing substantial suggestions regarding the social management of risk and thus makes a practical difference, thereby passing the test of non-triviality. He then proposes MPP as a sort of adequacy condition for acceptable *versions* of PP – to be further specified in terms of a "harm condition" and a "knowledge condition" relative to a "recommended precaution" (what Steel names "the tripod"), supposed to provide more specific and action-guiding statements on

what measures to justify under what conditions of risk and uncertainty and what access to evidence. A generic version of PP thus states that given a certain state of knowledge of the possibility of a certain sort of harm, a particular type of precautionary measure should or may be enacted. While the tripod corresponds well to several earlier analyses (Sandin 1999, Gardiner 2006, Manson 2002, Munthe 2011), Steel's way of relating MPP to PP is definitely novel. Rather than focusing on versions of PP (and their possible justification), viewing MPP as a spin-off result, Steel suggests that PP versions should be tested against how well they support or accommodate MPP. This difference connects both to Steel's mentioned downplaying of ethical theory, but also to the importance he places on being able to say both that PP is one unified idea (MPP), and may come in different versions (chapter 3), and make a case for justification of the unified aspect (chapter 4).

Steel then turns his sight on the other horn of the dilemma, addressing how a version of PP may escape the many charges of absurdity by its design of the tripod, without collapsing into ready-made standard risk analytical or decision theoretical solutions. To this general idea Steel adds his own way of describing *how* a PP version needs to be constituted in order to pass the test: It needs to meet the requirement of "proportionality", in turn divided into a condition of "efficiency" and one of "consistency". The latter is meant to disarm arguments against PP that it implies the paradox of recommending against or otherwise undermining its own prescriptions. The efficiency condition is there to meet the objection that PP has to prescribe unacceptable additional risks or opportunity costs. The chapter is rounded off with an elegant dismissals of various "threshold solutions" for how to specify the knowledge condition, such as the *de minimis* idea (a number of others focusing on thresholds in terms of extreme outcomes rather than tiny probabilities are equally handsomely dealt with in chapter

5), as well as the surprisingly common presupposition that PP needs to satisfy a number of axioms that would make it necessarily paradoxical.

Based on this, the book then takes off in different directions regarding the mentioned issue of unity (chapter 3) and what reason there is to accept MPP (chapter 4). A particularly rich discussion occurs in chapter 5, regarding how the concept of (scientific) uncertainty should be understood in the MPP/PP context – arguing against the relevance of a strict risk-uncertainty distinction grounding a suggestion of equating PP with Maximin or similar decision theoretical rules. Steel thereby questions standard risk- and cost-benefit analysis as the axiomatic solution to policy issues and argues convincingly that MPP/PP is superior both through a more generous concept of value and ability to handle decisions where the standard models apply ad hoc solutions of questionable merit for dealing with states of uncertainty or ignorance not captured by numerical models (or stay silent). In chapter 6, Steel digs a bit deeper into the value-side of this critique, discussing how scenarios involving the far future should be handled by MPP/PP. Thereafter, the focus is on what the evolving theory implies for the place of values in scientific reasoning and, based on this, a notion of *epistemic precaution* (chapters 7 and 8).

Steel's consistency condition is markedly different from other suggestions in the debate on how to deal with the challenge of avoiding "precautionary paradox". Steel's formulation of consistency says that a suggested "... precaution should not be precluded by the same version of PP used to justify it" (p. 28). Consistency is thus a feature not of *a justified PP version*, but of *a justified precautionary action, given some PP* (justified or not). Therefore, this condition cannot be used to fault any version of PP, only its ability to justify a precautionary measure. In contrast, my own condition of avoiding decisional paralysis (discussed by Steel on pp. 38-39 as a "misunderstanding" of consistency) is a desideratum for justified versions of PP: a

plausible PP must not systematically ban all options. Steel, however, claims that his own consistency condition would "eliminate versions of PP that ban everything" (p. 38), but *this* seems to be a mistake – a systematically inconsistent PP in Steel's sense would at best have been shown to be practically inert (just as any other normatively valid ethical norm that lacks practical application, e.g., "do not needlessly torture unicorns!"). Thus, my decisional paralysis condition is not about consistency at all, although serving to avoid precautionary paradox, and thus not a mistaken conception of consistency. Steel's and my own different starting points (philosophy of science and ethics, respectively) here seem to shape what we view as the central issue: whether or not a particularly precautionary measure is justified by a version of PP, and what version of PP that may be justified, respectively. While it makes good sense to pursue Steel's consistency condition regarding the first of these issues, this condition does, however, stay silent on the second one. It seems, therefore, that these perspectives could be combined without much fuss to the benefit of both, rather than forced into false opposition.

In this light, the other dimension of the proportionality requirement, efficiency, deserves similar comment. This condition simply says that among consistent precautionary measures recommended by a PP (justified or not), the least costly should be chosen. Like consistency, this is a condition not for a justified PP version, but for what precautionary action can be justified by a version of PP (justified or not). Thus, also this side of the proportionality requirement says silent on what versions of PP may be justified, although it does constrain what justified prescriptions of particular precautionary measures a PP version may generate. In effect, Steel's proportionality requirement does in fact not seem to help us ponder how the tripod should be specified, and what PP version to prefer. It does say that whatever PP is considered, it may only justify proportional precautionary measures. However, this provides scant guidance, as there are innumerable ways to set the knowledge- and harm-conditions

within a PP, so that proportional, yet radically different, recommendations of precautionary measures may be produced, implying large differences in terms of the "price of precaution" set by such versions. For instance, my own sketch of an ethics of risk informing the design of the tripod (Munthe 2011, ch.5) would allow both quite high and quite low costs of precautionary measures, depending on a complex of factors influencing the normative justifiability of both the knowledge- and the harm-condition. Of course, the proportionality requirement may be added to this, constraining which among the options prescribed by such a version of PP that can be justified, but the outcome of that in concrete terms would be different than if the starting point would be a version of PP setting different normative standards for the knowledge- and harm-conditions. That is, to get decision rule he aims for, Steel apparently would need to dig exactly in that place of ethics where he wants to avoid digging. Whatever comes out of such work would then seemingly be possible to combine with Steel's proportionality requirement.

So far, the shunning of ethical inquiry described might be seen as a mere expression of differences of interest. However, Steel's pursuit of unity in chapter 3and his account of why we have reason to bother with the notion of precaution at all in chapter 4 made me suspect deeper sources. The arguments pursued in these chapters also link to his assumption of MPP as standard against which versions of PP must be measured, used to great effect, e.g. in chapters 5 and 8. Steel's basic hunch regarding why MPP/PP is a good idea to start with is similar to many others': history apparently demonstrates that lack of evidence to the contrary, best intentions, and so on, have not been sufficient to guard against major and – in retrospect – unnecessary harms due to uses of technology and exploitation of the natural environment. Faced with the objection that it is highly uncertain whether or not (attempting to) applying MPP or a PP version would make any difference for the better in this respect, and that it

would therefore seem that this basis for justifying MPP/PP presupposes the conclusion it is supposed to deliver, Steel's choice is again to stop dead in front of any suggestion to probe ethical underpinnings. This is why Steel needs to seek the unity of PP in MPP (instead of its normative foundations, as is my own choice), and why MPP has to be held out as an axiom for many other conclusions. But this also means that Steel's entire theory hangs in the air normatively speaking; it does provide answers to many critical challenges, but fails to answer the basic question of why we should bother with taking precautions and, as we saw, what reasons there are to prefer one version of PP over another. In particular, it fails to back up Steel's idea of a requirement of correction of historical error, or indeed that there has been any historical error thus worth compensating for (p. 91). At the same time, Steel's dismissal of ethics rests on shaky ground, as he seems to believe that this means revisiting "controversial ethical theory baggage" (p. 94), and wrongly suggests that my own such attempt "assumes a non-consequentialist perspective", when it rather falls in with several others (e.g., Sven-Ove Hansson) addressing the ethics of risk and questioning the relevance of *all* established normative ethical theory families (consequentialist, non-consequentialist and virtue ethics). At the same time, the opposition created by Steel here once again seems false and unnecessary. He is right that one of the basic principles I have presented as a starting point for my own theory can be made to fit his own notion of the tripod (p. 93), but then ignores the actual ethical theory developed to provide substantial justification for and precision of this principle. Again, then, Steel's advances could perfectly well be combined with more solid normative underpinnings, and benefit substantially from this from the point of view of justification.

A last example of how Steel's approach may benefit from taking ethics more seriously is found in chapter 6. There he addresses how the harm-condition should handle risks in the far future, especially how ideas on discounting of future risks and harms, often uncritically

imported into risk analysis from standard models in political economy, should be assessed from a precautionary standpoint. Steel wants to argue for John Broome's idea of "intergenerational impartiality", but again struggles with ethical theory, finding attempts in that area lacking. Instead, he introduces the notion of "sequential justifiability", which is a required feature of a "Sequential Plan", i.e. a plan for enacting a specific policy over several generations. This suggestion rests solely on the idea that a rational decision-maker pragmatically needs to consider the willingness of future generations to carry on the policy. This, however, does not say anything about whether or not intergenerational impartiality should be a part of sound PP, as later generations may have preferences regarding the implied harms or risks departing from those held by the initial decision-maker. Or they may simply be willing to carry on the policy in spite of earlier discounting, e.g., to act more decently towards later generations. In addition, suppose there are serious effects affecting people beyond the time covered by the sequential plan – these seem not to be touched at all by Steel's solution. Again, then, Steel's theory would seem to fare better by being combined with exactly that normative ethical grounding he himself struggles to avoid.

None of this should, however, be seen as a reason to put Steel's book aside, or ignore its many fine advances. Taking the sort of qualitative leap that he does in this splendid work also means exposing oneself to detailed criticism. It is a virtue of the highest order of Steel's work that he does this rather than goes for the dull attempt of dodging bullets through lack of distinction. *Philosophy and the Precautionary Principle* without doubt sets a new standard for any forthcoming work in the area, and its theoretical contributions create an exciting landscape for further explorations of synthesising his results with those of others to find new and even better solutions to the pressing practical problems that the notion of PP has emerged to help us address. As mentioned, many of these problems occur well inside the realm of

interest of bioethicists, and especially the points made about epistemic precaution may provide well-needed injection to the way in which precautionary issues are applied regarding emerging technology, research ethics and public health as well as clinical ethical questions.

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