An Enlightened Revolt: on the Philosophy of Nicholas Maxwell

Abstract

This paper is a reaction to the book "Science and the Pursuit of Wisdom", whose central concern is the philosophy of Nicholas Maxwell. I distinguish and discuss three concerns in Maxwell's philosophy. The first is his critique of standard empiricism (SE) in the philosophy of science, the second his defense of aim-oriented rationality (AOR), and the third his philosophy of mind. I point at some problematic aspects of Maxwell's rebuttal of SE and of his philosophy of mind and argue in favor of AOR.

Introduction

This paper is a reaction to the book "Science and the Pursuit of Wisdom", whose central concern is the philosophy of Nicholas Maxwell. The book certainly does not provoke a unified reaction; one that could be condensed into a single line of discussion. Maxwell's philosophy is protean, a kind of philosophy which, I dare say, new generations of philosophers are not used to (myself included). Here the problem is not, as Maxwell would put it, that academic philosophy has embraced knowledge-inquiry instead of devoting itself to promoting wisdom-inquiry. Rather, it is that even within the knowledge-inquiry enterprise, rationalistic philosophy seems to have become more and more scholastic (see, for some discussion of recent analytic philosophy, Mulligan, Simons and Smith, 2006). In any case, the point is that most of us have been trained in a certain way of doing philosophy that primarily consists of puzzle-solving. To make matters worse, most of the puzzles we try to solve may, at one and the same time, be personally fascinating though not interesting in any profound sense.

The kind of philosophy that can be found throughout the pages of this book is not like that at all. It is philosophy that touches squarely on deep vibrant problems concerning ourselves and the world we live in. Philosophy at its best, some may claim. Perhaps. Good, interesting and, above all, important philosophy it certainly is.

In a passionate first chapter, Maxwell sums up his philosophical ideas. He distinguishes two research projects in his intellectual life. The first is his rebuttal of Standard Empiricism (SE) in the philosophy of science, a rebuttal that has led him to propose Aim-Oriented Empiricism (AOE) as a substitutive philosophy of science and

Aim-Oriented Rationality (AOR) as a methodology to adopt when we tackle our problems of living.He sees the two as intimately connected; AOR stemming from AOE. It is this line of thought that has led him to call for a revolution in the aims and methods of the whole academic enterprise. He believes that this enterprise should forsake knowledge-inquiry and embrace wisdom-inquiry; wisdom being, as he repeats once and again, the capacity to realize what is of value in life, both for oneself and for others. This is a proposal which could justly be called an enlightened reaction to the Enlightenment.

The second philosophical problem that has occupied Maxwell throughout his intellectual life is the problem of finding a place for ourselves (as ourselves) in the physical world. This problem seems to be intimately related to the first. On the one hand, Maxwell claims that one of the tenets of science, according to AOE, is that the world is physically comprehensible, i.e., that physics can provide a fully-explanatory account of everything. The question then arises: if that is indeed the case, how can we make room for our personalistic view of ourselves? On the other hand, Maxwell holds that wisdom-inquiry requires that there are persons, persons who act freely, enjoy and suffer, and who may seek valuable things. Such persons form societies, and AOR puts forward a methodology for them to use to arrive at some consensus regarding how best to tackle their problems of living. Thus, there is a necessity to explain how the conditions of possibility of AOR (that we are as we think we are) square up with the physicalist assumption of modern science.

I think that it might be more useful to distinguish three, instead of two, concerns in Maxwell's philosophy. The first would be his critique of SE in the philosophy of science, the second his defense of AOR, and the third his philosophy of mind. In my opinion, these three issues can be tackled independently of each other. In the following pages, that is what I will try to do: I will discuss Maxwell's contributions to these three areas separately and see how they fit together.

Standard Empiricism and Aim-Oriented Empiricism

Maxwell launches a heavy attack on what he sees as the implicit overarching assumption of science, namely, that science is an enterprise that seeks only factual truth, and whose basic method is to assess theories with respect to evidence only. He traces this assumption back to the Enlightenment project and sees it as infecting all

extant philosophy of science, Popper's philosophy included. Since its inception, empiricism has been put forward as a cure for metaphysics, and probably has done good work for some time. However, according to Maxwell, it is time that we acknowledged that this kind of empiricism does science no good. Empiricism thus understood places a ban on all metaphysical thinking (at least in the context of justification), but, as Maxwell sees it, metaphysics is an integral part of science. Being oblivious to this can only generate neurotic science, which pursues aims it is not ready to recognize (rather, they are aims it represses)[1].

That metaphysics is an integral part of science can be easily demonstrated, according to Maxwell. First, one has to keep in mind that theories are underdetermined by data. For any theory that is proposed in order to account for a set of data, we can think of an alternative theory that accounts for the data just as well. The difference between the theory we embrace and the alternative theories that we do not even entertain lies in some non-empirical virtues, such as simplicity or unificatory power, that the former has and the latter lack. Thus, theory choice is not just a matter of being faithful to the data. Secondly, it is not just that for any set of data we can find many different theories that are equally adequate from a purely empirical point of view. Rather, for any theory we can think of, we can always construe a theory that is empirically *more* adequate. Suppose theory T predicts data d_1, d_2 and d_3, but fails to predict data d_4. We can always construe a theory T' that predicts all of them. How? Simply by adding to T an *ad hoc* hypothesis (H) that enables us to predict d_4. Thus, T+H has more predictive power (is empirically more adequate) than T. Of course, we do not do this; but the fact that we do not do it cries out for explanation, and proves that predictive success, or empirical adequacy, is not the only value by which we judge our theories. Finally, a look at the history of science reveals that scientists have persistently opted for theories that had the power to unify the whole of their domain. Thus, for example, Newton's theory unified Galileo's laws of terrestrial motion and Kepler's laws of planetary motion; Maxwell's classical electrodynamics unified electricity, magnetism and light, etc.

So, the facts that considerations of simplicity and unity play a role in our theory choice and that we do not even consider non-unified *ad hoc* theories show not only

[1] See especially Maxwell (2004)

that empirical facts are not the ultimate standard by which our theories are judged, but also that science is deeply committed to some metaphysical assumptions. For a start, they show that science assumes that the world is unified in some sense; but, Maxwell contends, this is too abstract an assumption. It has to be implemented in some way or other in order to be meaningful and to have an impact on theory choice. However, we must be careful in how we give content to the assumption of unity. If the assumption of unity is inadvertently turned into the assumption that the only constituents of the world are corpuscles, for instance, then we may, also more or less inadvertently, block the development of fruitful theories that contradict such an assumption. For this reason, we have to be as clear as we can in the statement of our assumptions. To this end, Maxwell paints a picture in which metaphysical assumptions are hierarchically organized. At the top level of the hierarchy there are almost contentless and non-problematic principles such as the statement that the world is partially knowable. As implementations of this principle, there is a cascade of principles down the hierarchy, consisting of more and more contentful and problematic statements, such as the claims that the universe is comprehensible, that the world is *physically* comprehensible, or that the world consists of a certain class of entities (corpuscles, fields, strings, or whatever). Current theories, one step before the bottom of the hierarchy, are to be seen as implementations of the metaphysical claims higher up in the hierarchy. Data, finally, occupy the bottom level of the cascade.

As noted, Maxwell contends that metaphysical principles partially determine the methodology of science and consequently that the methodology of science could be significantly improved if metaphysical principles were clearly stated and openly discussed within science. Science should thus move up and down through the hierarchy, considering theories and data in the light of metaphysical principles and metaphysical principles in the light of theories and data[2]. In a nutshell, instead of rejecting metaphysics, the methodology of science should be (in part) devoted to laying out metaphysical assumptions so that they become objects of rational discussion.

[2] Not all metaphysical principles can be revised in the light of theories and data, though. The principles that we find upper most in the hierarchy, namely, that the world is partially knowable and that it is meta-knowable (i.e., that we can learn how to learn), would not be affected by changes in data and theories, or by the changes in the metaphysical assumptions that such changes in data and theories could entail. Rather, they could only be affected by a continued failure to understand the world; more on this later.

This is, very succinctly, what AOE consists of. It is a philosophy of science that substitutes the erroneous SE for a picture in which the metaphysical assumptions of the scientific enterprise are clearly stated and, as such, open to criticism[3]. It is noteworthy that, as Maxwell points out, the AOE approach shows why induction is not a problem for science: the uniformity assumption that, from Hume onwards, has been seen as required to ground any inductive reasoning, is precisely one of the metaphysical claims that science itself makes. Crucially, then, it is not just an assumption that is reinforced by –or even built on top of– the success of our theories, which themselves make use of induction. If the only justification for the uniformity assumption were that our theories somehow entail it, we would not have got very far; for the uniformity assumption would be grounded on just the kind of inductive reasoning it apparently justifies. Rather, what finally justifies the adoption of the uniformity thesis is the idea that the world is rationally discoverable, an idea which Maxwell claims is built into the principle of meta-knowability.

Unity and explanation

Now, it is possible to query some parts of Maxwell's discussion. It is true that science does not seek just any old truth, but rather it seeks *explanatory* truth. It is also true that values such as simplicity or unificatory power influence our theory choice. However, does this mean that science assumes that the universe is simple or unified in some sense and that this assumption plays some role in the development of science? Well, it could be argued that the choice of unified theories does not imply (and even less so, that it requires) that we assume that the universe is unified. It could be that we choose unified theories precisely because they have more explanatory power. As is well known, one view maintains that explanation consists precisely of unification; that is, we explain something when we are able to show that it is just another way of presenting something we already knew (see Friedman, 1974, Kitcher, 1989). It is not necessary to endorse the view that all explanation is explanation by unification in order to claim that our choice of simple unified theories may meet an epistemological demand –i.e., that our theories have explanatory power– and so it does not presuppose (and much less so, is it inspired by) any metaphysical principle whatsoever.

[3] Not at all like in Kuhn's philosophy, where metaphysical principles (only of a narrow kind) are regarded as constitutive parts of paradigms and thus not part of what scientists should discuss, except during a revolution.

To be sure, the scientific enterprise does support a uniformity principle. Its rejection of non-unified theories in favor of unified ones demonstrates this. However, the issue is whether such a uniformity principle plays a role in science or not. That is, the question is whether our preference for unified theories is a product of a uniformity principle or whether, in contrast, it just stems from an explanatory demand, with the uniformity principle being a sort of epiphenomenon. As I see it, AOE claims that uniformity, or comprehensibility, is a guiding conjecture in science. Maxwell illustrates this point by means of an example: suppose we find out that scientists only accept theories that postulate atoms –rejecting all other theories that postulate different basic entities. Then the lesson would be clear; scientists are presupposing that the world is made up of atoms. This presupposition is then leaving its trace in the methodology of science and making scientists select some theories instead of others. In this fictional case, it is clear that there is no possible explanation for scientists' theory choice other than that they assume the world to be made up of atoms. The problem is that when we try to explain why scientists persistently select unified theories we find two possible ways to go: we can say that they select them either because they assume the world to be unified, or because they seek explanatory theories. Now, given that science pursues explanation, and one way to explain diverse phenomena is to show that they are expressions of a single, underlying, type of fact, it seems to follow that the metaphysical assumption of unity may be none other than an epiphenomenon of the search for explanatory theories.

Maxwell (p.c.) objects to this line of thinking. His objection is as follows: it is true that science looks for explanation and that unification is a form of explanation. However, science also makes predictions. When science predicts the occurrence of a certain event, there is an assumption that this prediction will not violate uniformity. Thus, we reject non-unified theories not only in order to explain the world, but also in order both to predict new facts and to apply our science to real-world situations. If we want to build a bridge and we have two theories, one which is unified and predicts that the bridge will stand, and another which is dis-unified and predicts that the bridge will fall down, we will chose the first one. Now, what this means is that we take the unified theory to be *true* and discard the dis-unified one as false. Why is this so? Well, it seems that the only explanation is that we assume the principle of unity to be true.

Now, the point, again, is whether the assumption of unity is really playing a role

in our theory choice. We do choose unified theories and reject dis-unified theories both for explanatory and predictive purposes. We definitely trust unified theories. However, is it because they are unified, i.e., because they respect a uniformity assumption? It may be; but it may also be that we choose unified theories for predictive purposes simply because they are capable of explaining their predictions. Taking Maxwell's example of the construction of a bridge: if we have two theories, one which predicts that the bridge will stand *and* which explains why it will stand, and another which solely predicts that the bridge will fall down, being unable to explain why it will fall down, we will surely choose the first theory. We may well hold that our choice is grounded in our belief that explanatory theories are true, though perhaps such a detour through the truth value of our theories is unnecessary. As I say, our choice may be grounded simply on the capacity of the chosen theory to explain its predictions.

Is comprehensibility a metaphysical principle?

There is another, non-complementary way to question the metaphysical status of some of the principles Maxwell enounces[4]. Here, I will center this discussion on physical comprehensibility. We find that many physicalist-minded philosophers claim that a principle which implements physical comprehensibility—namely, the principle of the causal closure of the physical world (CCP)—is an empirical, inductively-supported claim (see, e.g., Papineau, 2001)[5]. As such, it can be falsified. Now, suppose these authors are right. In what sense would CCP be a metaphysical principle? It seems that only in the sense that it does not form part of the claims of any scientific theory. But is this reason enough to consider it interestingly different from the claims that theories do make? I guess Maxwell would say that it is interestingly different in that it is more abstract and, especially, in that it can be used as a methodological constraint on our theory choice. However, conservation laws also fulfill that role. Here I express a genuine worry: what is it that makes a claim such as CCP different from, for instance,

[4] I think that the principles that state that we can acquire partial knowledge of the world and that we can learn how to learn about the world are indeed metaphysical presuppositions, even though the so-called cognitive/naturalistic turn in the philosophy of science purports to make them scientific claims. However, there is an element of circularity in the whole cognitive program, which probably should be supplemented by the assumption that science can provide at least partial knowledge of how we get to know about the world and learn about how to learn about it. Naturalists would reject this approach and speak about a bootstrapping strategy –we may use science to explain how science is possible– but I find it difficult to understand this bootstrapping strategy in a non-circular way.

[5] This principle states that every physical event which has a cause has a sufficient physical cause.

a conservation law? And the point is: if CCP is not a metaphysical principle, then physical comprehensibility may turn out to be non-metaphysical too. For according to these very authors (and others such as Kim, 2006)[6], physicalism depends crucially on CCP. We have no better reason to believe in physicalism than our belief that the physical world is causally closed. Thus, an eventual rebuttal of CCP would entail a rebuttal of physicalism[7].

It is possible to wonder how a principle such as CCP could be falsified. The answer is quite straightforward: science could develop in such a way that it postulates irreducible non-physical properties. Such properties could be mental, but they could also be biological, geological, or have some other nature. According to present-day emergentists, such a development has already occurred (see, e.g., Kauffmann, 1995): When confronted with complex systems—systems that are far from equilibrium and exhibit some kind of self-maintenance—science has been forced to acknowledge that there are some facts that physics cannot account for. Thus, the behavior of the constituents of such systems cannot be fully explained unless we take into account that they are parts of a whole that restricts their degrees of freedom, or in other words, that constrains which physical laws are applied. Of course, there are many authors who do not agree with this reading of the situation. In their view, there is nothing in complex systems that cannot, as a matter of principle, be accounted for in terms of local interactions of fundamental particles (see, e.g., Davies, 2006). The point is that emergentism might turn out to be right, thereby falsifying physical comprehensibility (and probably, comprehensibility itself).

However, leaving the emergentism debate to one side, the issue can be stated in a simpler way: suppose, as Papineau (2001) claims, that the "rise of physicalism" has to do with a number of empirical discoveries, such as Helmholtz's first studies in neurophysiology and biochemistry, and, crucially, with the discovery that energy is actually conserved. If this is the case, it seems clear that physicalism can be falsified. Energy could be shown not to be conserved, and who knows what we could discover in the fields of neurophysiology. In summary, extraordinary forces could re-enter the

[6] For discussion see Vicente (2006, forth., b)

[7] More precisely, it would entail a rebuttal of *a part* of physicalism, at least as Maxwell understands it. For according to Maxwell, physicalism is composed of two theses: (i) that there is a true physical theory of everything; and (ii) that such a theory is unified. The rejection of the CCP would amount to a rejection of thesis (i) –which is what other authors label 'physicalism'.

scientific picture at some point.

It may be that this way of thinking about principles such as comprehensibility does not have much impact on the content of AOE. In fact, it may have no impact at all, in principle, since Maxwell himself acknowledges that data and theories may lead us to revise the principles that sit above them in the hierarchy of principles. So, again in principle, all of the above would only cast some doubt on Maxwell's calling principles such as physical comprehensibility 'metaphysical' and his main points would remain intact. For, metaphysical or not, they are heuristic guides that it is best to lay out explicitly so that they can be rationally discussed[8]. However, I think that this way of seeing things would have a serious consequence for Maxwell's overall philosophy of science. If principles at upper levels in the hierarchy are just *inductively supported generalizations*, then it seems that ultimately AOE is compatible with SE[9].

It is true that there would be two principles in the hierarchy that would be immune to empirical evidence: that the world is partially knowable and that we can learn how to learn about it. These may indeed be presuppositions that no data can falsify. However, if the rest of the principles are not, strictly speaking, implementations of these two, but stem from theories and data, then these two principles are disconnected from all the others, and play no substantive role in the interplay between data, theories and principles. That is to say, these two properly metaphysical principles would play no substantive role in *science*, apart from enouncing its conditions of possibility. In that case, AOE could be justly considered a "standard" empiricist philosophy of science.

The relations between levels

A final point I consider it worth making about the whole AOE schema is that it is not clear what relation there is between the alleged metaphysical principles and the theories, or indeed between the metaphysical principles themselves. It seems that a principle that lies at level *l* is an implementation of a principle that lies at level *l+1*, and that theories are the final implementations of whole cascades of principles. It also seems that a principle at level *l* implies the principles to be found at upper levels, and

[8] Incidentally, I think that this has already been done. See the immense debate about how to define and justify physicalism or concerning the notion of emergence.

[9] Another way to put the whole point is this: Maxwell's idea that principles at upper levels can be revised in the light of theories and data ends up committing him to the view that, after all, science has to do only with empirical facts.

that theories entail metaphysical principles. Thus, the principle that states that the world is physically comprehensible implements the principle that the world is comprehensible and implies it. However, this means that rejection of a principle at level *l* would entail rejection of the claims that lie below it in the hierarchy, theories included. Thus, rejection of the claim that the world is comprehensible would involve not only rejection of the claim that the world is physically comprehensible (which seems fair enough) but also rejection of our physical theories (which sounds problematic). In what follows I will try to explain this further.

Maxwell acknowledges that the relationships between levels 2, 3 and 4 are problematic. Level 2 is the level of theories, level 3 is the "blueprint" level—a level where physical comprehensibility is turned into an explicit claim about the ultimate constituents of reality—and level 4 consists of the assertion that the world is physically comprehensible. However, the reason why he thinks these relations are problematic is not the one that I have hinted at above. What Maxwell tells us is that General Relativity and Quantum Mechanics fail to implement physical comprehensibility. AOE therefore pronounces that they should not be accepted. Yet, they are accepted. So, he concludes, there is a clash between levels 2, 3 and 4. However, far from being a counterexample to AOE, this case can be turned into an argument in its favor, given that physicists strive to unify General Relativity and Quantum Mechanics, or to integrate one into the other. That is, our current physical theories fail to implement physicalism. Yet, it seems as though physicists are looking for a theory that does implement it. So, although right now the rejection of physicalism is consistent with our current theories (while physicalism is not), this situation can be seen as unstable: it is likely that future physics will be consistent with physicalism. I believe that the cases I have in mind are more problematic, for they show that, even when our future physics comes up with a unified theory, it is possible to reject physicalism (and more of the metaphysical principles Maxwell enounces) and yet leave physical theories untouched.

For instance, many philosophers and scientists alike (which, by the way, means that scientists are not that blind to the alleged metaphysical principles) would deny that the world is physically comprehensible. As explained above, there is currently a considerable number of authors who embrace emergentism in one version or another. All of these authors hold that some of the things that happen in the world, even in the physical world, do not have a physical explanation (at least if 'physical explanation'

means, as Maxwell takes it to mean, "explanation couched in terms of our fundamental physical theories"). For instance, Bedau (1997) claims that explanations of complex phenomena (such as the generation of traffic jams) lie forever out of reach of our explanatory powers, let alone of our fundamental physics theories. In general, the evolution of systems that are far from equilibrium can only be simulated; not predicted or explained on the basis of our knowledge of the workings of the world. This position is explicitly compatible with there being a physical explanation of complex phenomena, but an explanation that is forever out of our reach[10]. However, other authors take a stronger stance: they argue that complex systems, such as living systems, exert a non-reducible causal influence on the physical world by constraining physical powers (see Kauffman, 1995, Gillett, 2006). This is a stronger stance because the claim implies that the difference between complex and non-complex systems is not epistemic but ontological. So this kind of strong emergentism runs counter to physical comprehensibility and it runs counter to Maxwell's idea that physical comprehensibility is more likely to be true than our current (or future) physical theories are. Yet, this position has no impact whatsoever on our current physical theories (even in the case where they are unified). Emergentists think that physical theories are all right (to the extent that they can be all right). What they deny is that they cover, or can cover, all the facts of the world.

The emergentism/ physicalism debate typically revolves around complex phenomena. However, I tend to think that the issue may be clearer if we focus on selection processes (see Vicente, 2002, forth., a). For instance, functional properties are typically held to be causally inert (whatever they are supposed to cause, it is caused by their categorical bases). But when it comes to a process of natural selection functional properties do have causal efficacy: a heart is there not because it has this or that categorical physical property, but because it is a blood pump. Something similar can be said about relational properties. Relational properties are typically regarded as non-efficacious. Yet, if we want to explain why it is that an antelope got killed by a predator, we will have to mention that it was the weakest member of the herd (it was selected by virtue of being thus related to the other antelopes). Such an explanation is not a physical explanation; yet, it cites the cause of the event to be explained, so it is a

[10] Thus, "epistemic emergentism", as one could call it, is, as such, entirely compatible with Maxwell's picture. In fact, Maxwell himself acknowledges that physical explanation has limits. The stance which is problematic is ontological emergentism.

strictly causal explanation. So, it seems that there may be more causes in the world than physical causes. However, this possibility does not touch on the correctness of our current or future (eventually unified) physical theories (which, on the other hand, would complicate the issue by providing their own explanation: see Vicente, forth., a).

Something along the same lines can be said about philosophical proposals such as Nancy Cartwright's or John Dupré's (see Cartwright, 1999, Dupré, 2001). These authors deny that physics is in the business of providing an explanation of everything. Rather, physics gives us only very restricted explanations; explanations of what happens in highly controlled environments. That these views about physics are possible suggests that our theories are compatible with metaphysical stances very different from Maxwell's position. Thus, the rejection of principles such as physical comprehensibility, or of comprehensibility, has no impact on our theories, which, in turn, means that it cannot be that theories are implementations of such principles.

Aim-Oriented Rationality and Wisdom-Inquiry

I have expressed some doubts about Maxwell's philosophy of science, his AOE. It may be that the deep metaphysical commitments Maxwell speaks about are not metaphysical after all, either because they are primarily explanatory commitments or because they are empirically grounded. However, I have fewer doubts about the correctness of Maxwell's more general AOR, which he presents as modeled after AOE, much in the way Popper's philosophy of social life was modeled after his methodology of science. Thus, AOR proposes a rationalist methodology for tackling the problems of living that parallels the rationalist methodology for theory choice that AOE embodies. We are invited to formulate and openly discuss the aims of life (what is of value in our lives and in the lives of others) in an interplay between the less controversial and more abstract aims and the more practical and immediate, including the level of know-how, where we discuss how best to realize the aims we have formulated.

Moving from AOE to AOR involves two steps. First, it is necessary to acknowledge that the scientific enterprise is constrained not only by implicit metaphysical assumptions, but also by implicit goals. The scientific agenda is driven by these goals, which range from the most general to the most specific, and they should be openly and carefully formulated and discussed. Science does not explicitly

recognize this motivation, just as it does not explicitly recognize the assumption that the world is a certain way. Rather, the idea that values have something to do with the workings of science is repressed. This state of affairs gives rise to a moral problem: since the question of values is not discussed within science, the scientific agenda is not under rational control, and science ends up doing more harm than good and taking the world to the edge of catastrophe. In order to stop this irrationality, Maxwell proposes that science should be clear about what its ultimate goal is, which should be none other than improving our knowledge, understanding and technological know-how concerning truth of genuine value, and making this available to those concerned. What needs to be discussed is how this general aim of science is to be implemented.

Now, once this is settled, we can see that this very general goal of science should guide all our intellectual efforts. Our many and various academic disciplines should be devoted to finding out the best way to improve our lives and to realizing what is of value for oneself and for others. This is what Maxwell calls "wisdom-inquiry". AOR, then, is a methodology for pursuing wisdom-inquiry (and, more generally, is a methodology for life). It tells us that we should articulate our goals in a hierarchical fashion and that we should scrutinize them in open discussion, thus moving back and forth between very general aims to very particular ways of realizing them by a rational process of deliberation.

I find these ideas fascinating, and I cannot but believe that Maxwell is right about his two main points: first, that we should put our scientific knowledge to the service of our ethical goals, and second, that academic life should pursue wisdom-inquiry. It is certainly difficult to think of practical ways of implementing the academic revolution Maxwell advocates (or at least, I certainly find it difficult)[11]. I am also skeptical concerning the possibility of objectively, or intersubjectively, identifying to the required degree "what is of value for oneself and for others". There are different conceptions of the good, and discovering some underlying unity to all of them has been a persistent problem. However, I am convinced that we can at least identify the threats and put all our intellectual strength into fighting them. I cannot but wish Maxwell (and all of us) the best of luck in the endeavor. Academia needs to be

[11] In this respect, I found Cophrone McDonald's contribution to *Science and the Pursuit of Wisdom* very useful; he details the kind of studies that can (and do) articulate and give content to Maxwell's academic revolution.

shaken up and restructured in very many ways, but I think Maxwell has identified a crucial one: academia, inspired by the success of science in providing knowledge, is focused exclusively on merely producing knowledge. However, this should not be its task. Rather, it should be focused on helping us to live better lives.

Maxwell's critics would probably claim that academic studies should not be bothered by ethical questions. In particular, that *science* should not be bothered by ethical questions. Yet, this seems to be an untenable position, as I will now attempt to explain.

For a long time, science has been taken to be an emancipatory enterprise. It was seen as the proper locus of rationality and, with it, the proper locus of free thinking. Science was the main weapon against dogma and, as such, the main ally for those who sought a better society[12]. However, it is risky, to say the least, to go on assuming that scientific growth equals increased emancipation, given the kind of knowledge that science has put in our hands and, somewhat inevitably, the use that has been made of that knowledge. As a matter of fact, the overall perception of science has probably changed: science is no longer predominantly seen as good in itself, but rather as *neutral*. This change of perception does not apply equally to all branches of science: research in medicine, for instance, is probably still seen by the vast majority as beneficial. However, if people are asked about science without qualification, we can surely expect the most usual response to be that science is morally neutral.

The reason behind this shift in the perception of science—from intrinsically good to morally neutral—has to do with all the things seen as non-beneficial that science has been associated with since the Second World War, from nuclear weapons to genetic manipulation. In the fashion of the Golem or Frankenstein myths, scientific knowledge has opened the door to ways of living that are more and more alienating. This has led some to adopt an apocalyptic view of science. However, the general reaction has been more conservative: the blame is not put on science itself, but on the society that puts scientific knowledge to bad use. Thus, science is seen as an enterprise that produces knowledge that is morally neutral; society is seen as being responsible for putting it to good or bad use. As a consequence of this view it is

[12] A wonderful piece where this is made conspicuous is the film (and the play that inspired it) *Inherit the Wind*, based on the famous "Scopes Monkey Trial". In it, Henry Drummond, the character played by Spencer Tracy, bases his defence of the teacher prosecuted for having taught evolutionary theory on the identification of science and free thinking.

society that is to be morally scrutinized, not science.

However, this is wrong. First, just because science is seen as neutral does not imply that it should necessarily develop independently of all social interests. That science is neutral means, *inter alia*, that it can be put to good or bad use, but it does not mean that we have to wait for science to give us knowledge before we decide what to do with the knowledge it produces. It makes perfect sense to state what we want science for before the event, and then to pursue the science we need to achieve those aims. No doubt many who think that the scientific enterprise should develop in the absence of social interference will object to this line of thought. According to such thinkers, in order to really flourish, science requires total freedom: the only thing that society has to do in relation to science is ensure that scientists are left alone to get on with it. Besides, it can be argued that we have lots of examples of science being developed for evil ends but turning out to be beneficial[13].

The second argument against the *laissez-faire* attitude to supposedly neutral science is stronger. The argument simply denies that science is neutral. Certain scientific truths (just like any other truth) can be harmful, and only harmful. Others are directly beneficial. Take Kitcher's (2001) case against sociobiology (see also Dupré, 2001). Suppose we discover, as some evolutionary psychologists have claimed to have discovered (see Thornhill and Thornhill, 1983), that men have an innate, adaptive, disposition to rape. Suppose this is one of those scientific claims that hit the newspapers. What are we to expect from knowing this? We can be told that it is just a fact and that it does not justify rape at all, but would not the social perception of rape change? It is predictable that it would, and that it would increase certainly the helplessness of victims, if not also the frequency of attack. Thus, what good can this "truth" be put to?

Or take the research into intellectual differences correlated to racial or gender differences. Suppose it is claimed that some particular racial or gender group performs worse in a number of intellectual domains on an innate basis. The self-perception of that specific group would be seriously harmed (see Dar-Nimrod and Heine, 2006) and the contempt of the others would be reinforced. This is all predictable. So, what good could such a "truth" bring? It cannot but have negative

[13] In *Science and the Pursuit of Wisdom*, Margaret Boden gives the example of the development of Cognitive Science.

consequences. A science that seeks this kind of truths is not a neutral enterprise that should be given its chance to flourish. Rather, it is a potentially harmful science that has to be avoided on moral grounds.

Kitcher's cases are controversial, but they are of special interest because they touch directly on knowledge; it is more common to argue against the moral neutrality of science by means of examples that involve technological applications of science, such as nuclear weapons, polluting industries or transgenics. The defender of neutrality, however, could call upon the distinction between science and technology, and argue that while science is neutral its applications surely are not. This is something they cannot do in Kitcher's cases, and that is why they are especially interesting.

Cases that involve technology are also worth considering for at least two reasons. First, because it is possible to argue that the distinction between science and technology is untenable, since science is mostly driven by technological goals. This means that it is not such a neutral enterprise. Second, because such cases help us see why the objection to the idea that science is influenced by social interests as outlined above is not sound. Science is put to the service of technology; technology, in turn, serves social goals. For instance, someone working on how to implant the gene known as *Terminator* in a new transgenic cereal is performing research that is driven by a very specific interest: that of producing a cereal that cannot reproduce. (Or in other words, ensuring that all seeds have to be bought from the company that produces them.) So science is already driven by social goals. That is, these cases serve as an existence proof that science can flourish even if scientists are not totally free to set their own agenda. It makes perfect sense, therefore, to argue that the social goals that drive science should be openly discussed, even if it is conceded that science is morally neutral.

Yet, cases that involve technology also show that science is not morally neutral, for they help us see how science is produced and funded, and why certain matters become the object of research while others are scandalously neglected. Science is pursued with certain ends in mind; ends which can be morally evaluated. Some are good, some bad and some are indeed neither one nor the other. So, again, it makes perfect sense to claim that we should put science to the service of "what is of value". It is precisely Maxwell’s insistence that science is not a neutral enterprise and that it

should be guided by explicit ethical aims that I find most appealing in his writings.

One possible objection remains, though. As I mentioned above, there are plenty of cases where science that has been put to evil goals ends up bringing about good. In her chapter, Margaret Boden proffers the case of Cognitive Science. The worry here is that if we only do the science that is seen as beneficial, we will miss all the good science that has had a more tortuous development or an obscure pedigree. The answer seems straightforward when one is confronted with military science: while it is true that we might miss a fair amount of scientific developments that are beneficial in the long run if we are strict on our moral concerns, it is surely more important to ensure that we do not run risks at this stage of our development. Yet, things get more complicated when one thinks about research that is not so obviously tied to what can be seen as evil interests. This includes: research that is simply seen as not immediately beneficial; research that is believed to be less likely to produce harm than to be beneficial; research that is believed to be more likely to produce harm than to be beneficial, although its possible benefits are greater that its possible harm; and so on. The task of deciding which lines of research should be pursued and which ones should not is an extremely difficult one. However, I take it that this just attests to the difficulties that Maxwell's program faces up to. For it can be said that, in general, the task Maxwell charges philosophy with (together with all the other intellectual disciplines) is extremely delicate, full of uncertainties, and deeply problematic. It is not at all like deciding whether or not proper names are indeed rigid designators, to give one example. However, as far as I see it, it is a task we should undertake.

A final word about AOR. I find Maxwell's proposal revolutionary not only because of what it implies about the way we do science; it is also revolutionary because it restores the application of rationality to ends. In effect, Maxwell's proposal runs counter to Hume's *dictum* that reason is, and should be, the slave of passions; a thesis which has the consequence that the sphere of rational choice and rational discussion is restricted to the realm of means. Hume's thesis has probably been the prevailing thesis in much of our modern thought, and has lost force in post-modern thought only because post-modernists profess a distrust of rationality applied to any realm at all. In contrast, Maxwell calls for a re-inclusion of the sphere of ends in rational deliberation. This is yet another reason to consider Maxwell's philosophy as a

correction of the Enlightenment (or better still, the empiricist) project; an enlightened correction[14].

A room for ourselves

As he himself tells, Maxwell's other main concern has been to understand how humanity, the world of persons, goals and values, is possible at all in a world which is nothing but physics. This is a question that has to be tackled by any intellectual enterprise worthy of the name "philosophy". However, Maxwell thinks it is especially urgent for him to address this question for another reason: it is a condition of possibility of AOR that there be people and values. Otherwise, it makes no sense to discuss how we should look for what is best for ourselves and for others. That is, there can be no wisdom-enquiry unless the world contains not just particles and forces but also people who act freely and things that they value.

There is indeed a clash between what Maxwell claims modern science has taught us and the manifest image we have of ourselves. Remember that Maxwell holds that one of the metaphysical principles that guide modern science is that the world is physically comprehensible. This means that there is a complete explanation of absolutely anything that goes on in the world couched in terms of fundamental physics. This, in turn, seems to imply that we exist in the world only as entities constituted of particles and forces, that our behavior is fully determined by the laws of physics and, *a fortiori*, that there is no room for personalistic explanations, agency or mental activity as such. Either all of these are straightforward illusions, or they are reducible to physical goings-on; which again means that they are not what they seem to be.

Some authors seem to be content with the idea that agency is an illusion (see, e.g., Wegner, 2004, Carruthers, 2007). According to such authors, our acts have an unconscious, uncontrolled origin. Only after we have begun our acts, do we generate the illusion that we, as people, are in control of what we do, that is, that our actions are indeed *our* actions, or that the person is acting. Some other authors are content

[14] It is surely wrong to identify the Enlightenment project with empiricism, even if empiricism has been the dominant way in which (especially in the Anglo-Saxon world) the Enlightenment project has been developed. In fact, that the Enlightenment project only partially coincides with the empiricist project is what makes it possible to hold that Maxwell's is an enlightened revolt. It is a completely rationalistic correction to the overall form the Enlightenment project has taken.

with the idea that all mental causation is physical causation (see, e.g., Lewis, 1966, Papineau, 2002). That is, that there are indeed mental processes and mental causes, but only as long as they are identical to physical processes and physical causes. Another group of authors defends the idea that mental events are not identical to physical events, given that, as they say, mental events supervene on physical events. Yet, under the supervenience account, mental causal chains just mirror physical causal chains. This makes it very difficult to find a place for agency and control within mental causality; beliefs and desires may cause behavior, but they cause them just as deterministically as physical causes do (see Kim, 1993 for a development of the "supervenience" account, and Hornsby, 2004, and Horgan, 2007 for a rebuttal of this "standard picture").

Maxwell, however, strives to do justice to our self-image and to vindicate all the aspects of mentality that we attribute to ourselves, from sensations to full-blown agency. This is by no means an easy task. Indeed, I think Maxwell's efforts must fail, at least given the constraints he himself places on them, namely, that they have to respect the physical comprehensibility of the world. As I see it, there is no room for persons in the world if it is the case that the world is physically comprehensible. Let me explain.

Maxwell (see, especially, 2001) argues that mental states are identical to physical states. However, he is not a reductionist, for he takes the identity relation in question to be contingent. That mental states may be only contingently identical to physical states is one of the few things that most philosophers take to be demonstrably wrong. After all, Kripke taught us that identities between natural kinds must be necessary (if they are identities at all). Maxwell, however, thinks Kripke is wrong. Personally, I think it is Maxwell who is wrong here. However, I will go along with Maxwell on this point in order to explain where I think his picture fails.

Suppose then that mental states are contingently identical to physical states. In contrast to other identity theorists, Maxwell takes it that the type-identity thesis can be understood in the following way: our brain events have two *aspects*, the physical aspect and the mental aspect. These two aspects are like the two sides of a coin: two ways to view the same entity. However, when we consider the mental aspect of a brain process, we have a description of it that draws on a personalistic theory (i.e., a theory that makes use of experiential predicates, and that postulates the existence of

selves and free will); whereas when we consider its physical aspect, we are concerned with a (more or less) deterministic account[15]. Now, how can this be? It seems that Maxwell has a problem here, for if mental states are indeed identical to physical states, then mental causal chains must mirror physical causal chains, so that if the latter are deterministic, so must the former be. In a nutshell, where is agency to be found in this account? It seems that Maxwell's picture is an interpretation of the "standard picture" of mental causation mentioned above; a picture that is unable to explain our agency.

In a long dialogue concerning compatibilism and incompatibilism, Maxwell (2010: ch. 7) tries to resolve this problem. His idea is that our minds are natural/physical control-systems made up of a complicated hierarchy of feedback loops and motor systems. We are not aware of the detailed workings of these control-systems, but we are aware that we adjust our responses in accordance with changes in the world around us. That is, the sense of control is the experiential side of certain neurological events that are responsible for controlling our reactions to environmental changes. This, I think, is indeed a way to make the "standard picture" compatible with the feeling of agency. Some mental states that correlate with brain events are characterized by the feeling of control[16]. Given that, according to Maxwell, mental states are identical to brain states, it can safely be maintained that the states in which we see ourselves as agents are in fact the states that cause our different behaviors.

So far, so good. Now, for the problems. First of all, Maxwell's ideas may have problems with the neuropsychology of free will. Libet's (1983) and Wegner's (2002) experiments, as well as evidence recruited from the study of patients whose *corpus callosum* had been severed, seem to tell against the idea that the consciousness of will is the visible side of the neurological causes of our actions. Libet's experiments allegedly show that our sense of control arrives some time after the act has been initiated. Wegner's illustrate how easy it is to create the illusion that we are in control,

[15] Maxwell is not a determinist. Rather, he believes in probabilistic determinism. I think this point does not carry much weight in this context.

[16] Maxwell would put this differently: according to him, what we have to explain is not our sense of control, but control itself. The person's self is just the control aspect of the brain. However, I take it that explaining brain-control is not the same as explaining free will. The explanation of free will seems to require that we explain how it is that our behaviour is under the control of our conscious will, that is, that our actions are brought about by our conscious deliberations and volitions as such. I am not sure about this, but it looks as though the control system Maxwell speaks about falls more on the side of the physical –broadly understood- than on the side of the mental.

even when we are not. The study of patients whose two hemispheres are mutually isolated suggests that we may be making up the reasons for our actions; that is, that our actions may be the result of causes we are unaware of while we claim to be certain of their etiology. In the light of all these studies, it seems difficult to hold, as Maxwell does, that the feeling of conscious will correlates to the brain causes of our actions (and it is even less plausible that it is identical to them).

Next, Maxwell's general *dual* aspect theory resembles Davidson's anomalous monism, except that Maxwell holds that mental events and physical events are type-identical, not just token-identical. However, this difference does not save his theory from sharing some of the problems of Davidson's approach. In particular, it does not save Maxwell's idea from the threat of epiphenomenalism. Davidson was accused of being an epiphenomenalist (see McLaughlin, 1992) because he was unable to explain how our behavior could be produced by the mental aspect of brain events. According to Davidson, brain events admit of two kinds of description (two kinds of aspect): a mental description and a physical description. Davidson concedes that any physical effect has a sufficient physical cause, so it is clear that behavior, inasmuch as it is identified with a physical effect, has a physical cause. This, in turn, seems to imply that behavior is caused by the physical aspect of brain events, and that their mental aspect is just an epiphenomenon. Davidson tried to reject the charge of epiphenomenalism (see Davidson, 1993), but without much success. The moral to be drawn from the discussion of anomalous monism is that, as long as an account distinguishes between the mental and the physical—be it under the guise of properties, descriptions, aspects or whatever—it is always possible to ask: in virtue of which property/aspect, or under which description, are brain events causing what they cause? This is a question that can be posed to Maxwell, and I think that he is in no better a position to answer it than Davidson is.

In a nutshell, I think Maxwell's picture, like so many others, falls prey to the famous *exclusion problem* (see Kim, 1993). If we accept that the physical world is causally closed, then the work of mental properties/ mental aspects is screened off by the work of physical causes/ physical aspects. All of the attempts to solve this problem have failed, and I see no way out for Maxwell.

However, sometimes it seems as though Maxwell would have no problem in

embracing epiphenomenalism. In fact, he seems to be the first contemporary epiphenomenalist (see Maxwell, 1966, 1968). According to him, physics is restricted to the causally efficacious and is silent about all the other things that may exist. In particular, it is silent about the experiential. Thus, Maxwell's position antecedes in some decades the essential ideas developed by current defenders of "qualia". However, there is an important difference between current qualia epiphenomenalists and Maxwell. Current epiphenomenalists restrict their discussion to sensations and do not extend it to other mental states such as beliefs and desires. One possible reason for this restriction can be that, while we may think that our sensations may play no causal role, we are much more reluctant to concede that we do not act on the basis of what we believe and desire. Giving up on this is much more harmful to our self-image. However, when Maxwell claims that only the physical is causally efficacious, he seems to concede that *no* aspect of our mental life (as such) has any causal influence whatever. This, I think, is too extreme a position. So, to put things in the form of a dilemma: either we defend mental causation, thereby holding that mental aspects are causally efficacious as such, or we give it up. If we want to hold that mental aspects have causal efficacy, we compromise the completeness of physics. If we deny that mental aspects are causally efficacious, we compromise our self-understanding as agents[17].

Maxwell's *dual* aspect account tries to have it both ways: it tries to respect physicalism while endowing mental properties with a life of their own. The physicalist demand is imposed by Maxwell's own physicalist credo discussed above. The search for a distinctive place for mental properties is fuelled not only by his trying to do justice to our experience of ourselves, but also by the need to make room for wisdom-inquiry. If there are no selves in the world, no people or agents—that is, if the only thing that there is, is the physical, in and of itself, there seems to be no point in carrying out anything other than knowledge inquiry.

Maxwell struggles to do justice to physicalism on the one hand, and to mentality and agency on the other, by holding onto an identity theory that sees the mental and

[17] Maxwell will probably think that the dilemma is unsound because there is a third option not considered, i.e. that mental and physical states are identical. This third option enables us to claim that, while mental aspects are inert, mental states are causally efficacious. But the problem is that we seem to want mental states to be causally efficacious *in virtue* of their mental, and not their physical, aspect. This "*in virtue*" problem was, in the end, the problem that caused the fall of anomalous monism, and, as I say, I see no way out for Maxwell either.

the physical as different aspects of the same thing. I have suggested that there are reasons to be skeptical about his success, but I cannot close without highlighting that Maxwell's work, here and elsewhere, is far from typical academic work. Rather, it is thoroughly lively work where one can feel the breath of a genuine honest philosopher who devotes all his intellectual strength to struggling with gigantic (and perennial) philosophical problems. So, my last word here is a word of gratitude. Thanks for revitalizing the Enlightenment, and thanks for revitalizing Philosophy.

References

Bedau, M. A. (1997) "Weak Emergence", in Tomberlin, ed., *Philosophical Perspectives: Mind, Causation, and World*, 11: 375-399.

Carruthers, P. (2007) "The Illusion of Conscious Will", *Synthese* 159: 197-213.

Cartwright, N. (1999) *The Dappled World*, Cambridge: Cambridge University Press.

Dar-Nimrod, I; Heine, S. J. (2006) "Exposure to scientific theories affects women's math performance", *Science* 314: 5798; 435.

Davidson, D. (1993) "Thinking Causes", in Heil and Mele, eds. (1993) *Mental Causation*. Oxford: Clarendon Press.

Davies, P. (2006) "The Physics of Downward Causation", in *The Re-Emergence of Emergence*, Davies, P, and Clayton, P. eds., Oxford: Oxford University Press.

Dupré, J. (2001) *Human Nature and the Limits of Science*. New York: Oxford University Press.

Friedman, M., 1974, "Explanation and Scientific Understanding", *Journal of Philosophy*, 71: 5-19.

Gillett, C. (2006) "Samuel *Alexander's* Emergentism", *Synthese* 153:261-296

Horgan, T. (2007). Mental Causation and the Agent-Exclusion Problem. *Erkenntnis* 67: 183-200.

Hornsby, J. (2004) "Alienated Agents", in De Caro and Macarthur, eds. *Naturalism in Question*, Harvard University Press.

Kauffman, S. (1995) *At home in the universe.* New York: Oxford University Press.

Kim, J. (1993) *Supervenience and Mind*. Cambridge: Cambridge University Press.

Kim, J. (1998) *Mind in a Physical World*. Cambridge: Cambridge University Press.

Kitcher, P. (1989) "Explanatory Unification and the Causal Structure of the World", in Kitcher and Salmon, eds. *Scientific Explanation*, Minneapolis: University of Minnesota Press.

Kitcher, P. (2001) *Science, Truth and Democracy*, New York: Oxford University Press.

Lewis (1966). "An Argument for the Identity Theory". *Journal of Philosophy* 63 (2):17-25.

Libet, B., Gleason, C. A., Wright, E. W., and Pearl, D. K. (1983). "Time of conscious intention to act in relation to onset of cerebral activity (readiness-potential). The unconscious initiation of a freely voluntary act". *Brain*, 106:623-642.

Maxwell, N. (1966) "Physics and Common Sense", *British Journal for the Philosophy of Science*, 16: 295-311.

Maxwell, N. (1968) "Understanding Sensations", *Australasian Journal of Philosophy*, 46: 127-146.

Maxwell, N. (2001) *The human world in the physical universe: consciousness, free will and evolution*, Rowman and Littlefield, Lanham.

Maxwell, N. (2004) *Is Science Neurotic?*, London: Imperial College Press.

Maxwell, N. (2010) *Cutting God in Half - and Putting the Pieces Together Again: A New Approach to Philosophy*. Pentire Press: London.

McHenry, L. ed., (2009) *Science and the Pursuit of Wisdom: Studies in the Philosophy of Nicholas Maxwell*, Ontos Verlag.

McLaughlin (1993). "On Davidson's Response to the Charge of Epiphenomenalism". in Heil and Mele (eds.), *Mental Causation*. Oxford University Press.

Mulligan, K., Simons P. and Smith B. (2006), "What's Wrong with Contemporary Philosophy?" *Topoi*, 25: 63-67.

Papineau, D. (2001) "The Rise of Physicalism", in Gillet and Loewer, eds. *Physicalism and its Discontents*, Cambridge: Cambridge University Press.

Thornhill, R. and Thornhill, N. (1983), "Human Rape: An Evolutionary Analysis", *Ethology and Sociobiology* 4:137-173.

Vicente, A. (2002), "How dispositions can be causally relevant", *Erkenntniss*, 56, 329–344.

Vicente, A. (2006) "On the Causal Completeness of Physics", *International Studies in the Philosophy of Science* 20:149 – 171.

Vicente, A. (forthcoming, a) *Philosophical Studies*, available on-line: DOI 10.1007/s11098-009-9477-4.

Vicente, A. (forthcoming, b) "Current physics and ''the physical''", *British Journal for the Philosophy of Science*.

Wegner, D. (2002). *The Illusion of Conscious Will*. MIT Press.