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Essay review

Maxwell's lonely war

F.A. Muller

Institute for the History and Foundations of Science, Utrecht University, P.O. Box 80.000, 3508 TA Utrecht, The Netherlands

The comprehensibility of the universe. A new conception of science
Nicholas Maxwell; Oxford: Clarendon Press, 1998, pp. ix + 316, US $72, ISBN 0-19-823776-6

The human world in the physical universe. Consciousness, free will, and evolution
Nicholas Maxwell; Lanham: Rowman & Littlefield, 2001, pp. xv + 303, US $60, ISBN 0-7425-1266-6

1. Introduction

The two books under review (abbreviated as *Universe* and *Human*, respectively) constitute, together with *From Knowledge to Wisdom. A Revolution in the aims and Methods of Science* (which dates from 1984, and I shall largely ignore henceforth), a triptych which we ought to consider as the philosophical legacy of Nicholas Maxwell, Emeritus Reader at the University of London. A comparison to his hero and teacher in London during the 1960s, Karl Popper, is illuminating.

Like Popper, Maxwell takes the problem of induction extremely seriously. Like Popper, Maxwell vehemently rejects the Copenhagen Interpretation of quantum mechanics, advocates the propensity "interpretation" of probability, subscribes to ontological indeterminism, takes science to be a quest for truth, is a realist, is against reducing the mind to the brain. Like Popper, Maxwell has an unrelinquished faith in the spirit of the Enlightenment and writes with a passion that sometimes takes the better of him. Like Popper, Maxwell lives in a permanent state of war with his contemporaries and in his heart believes that *if only* they were to understand his view properly, they would see that there is no other option than to embrace these views. But, unlike Popper, Maxwell has not yet mobilized a small army of converts who fight his battles with him side-by-side. It would be an injustice, however, to let oblivion get a hold on Maxwell's entire philosophical legacy, because some of his

E-mail address: f.a.muller@phys.uu.nl (F.A. Muller).

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insights are of everlasting importance to the philosophy of science, the fact that he stands on the shoulders of giants (Hume, Popper) notwithstanding.

2. Metaphysical realism

As the subtitle of *Universe* says, Maxwell expounds a new conception of science he has been working on and publishing about for a quarter of a century (Maxwell, 1974). This conception is a brand of metaphysical realism, aberrantly baptized "aim-oriented-empiricism" by Maxwell; we refer to it as "MR", where the "M" stands for "Maxwell" or "Metaphysical" or "Mistaken" or "Magnificent", and the "R" for "Realism". In *Human*, MR is also called "post-Popperian Kantianism" (p. 85). Although Maxwell claims in *Universe* that MR covers science generally (p. 46), the book is wholly devoted to physics.

Maxwell subdivides the whole of our knowledge of the universe in a number of levels (partly my terminology and simplifications: level 4 actually comprises four and level 5 two levels):

1. *Empirical*: the observed phenomena, the evidence.
2. *Theoretical*: the currently accepted scientific theories.
3. *Ontological*: the standard ontology (if there is one) that underlies the best of the currently accepted theories.
4. *Metaphysical*: several general theses concerning the nature of the universe, such as physicalism.
5. *Transcendental*: necessary conditions for the possibility of science.

These levels form a *hierarchy* in that as we move upward (typographically downward), knowledge becomes less specific and more general, and by implication, less susceptible to confirmation and refutation by the evidence; but it also becomes "increasingly likely that these theses are true" (*Human*, p. 53), with at the transcendental level bare truths that are as *a priori* as statements about the universe possibly can be. In contradistinction to Popper, Maxwell does not sharply demarcate science from metaphysics but sees the difference as a matter of degree; our knowledge becomes less scientific and more metaphysical as we move upwards in the hierarchy. Maxwell submits a fairly unexplained notion of "precision" as indicating "how metaphysical" a theory is: "All matter consists of atoms" is a metaphysical statement because it is very "imprecise", but when seen as part of Dalton's chemical theory, it is a scientific one because, then, it suddenly has become "precise" (*Universe*, p. 271). The knowledge-hierarchy has a historical dimension: it is not fixed once and for all. This is evident when we look at the first levels: the *observed* phenomena, the *currently* accepted theories, and the ontology that underlies the best of the *currently* accepted theories (which Maxwell prefers to call "the current blueprint of the universe"). At any point in historical time, what is accepted at level n is the best available exemplification of what is antecedently accepted at level $n+1$ (for $n \geqslant 2$).

The central question is: why adopt MR and its hierarchy? The answer consists of two parts: a motivation and a justification. The motivation (Chapter 1 of *Universe* covers this) is that a competing conception of science — or rather, a competing family of conceptions of science — called "Standard Empiricism" blatantly contradicts a salient although infrequently mentioned fact about science (read on). The justification (the five subsequent chapters cover it) is that Maxwell can solve ten philosophical problems about science that the competition cannot solve, least of all Standard Empiricism. We shall take these points in turn.

2.1. Motivation

Standard empiricism (SE) is the view that the decision to accept or reject a scientific theory is (ultimately) based exclusively on the available evidence; presumably as a consequence of this, science accepts no permanent, substantial "metaphysical" theses about the nature of the universe (as part of our scientific knowledge). Maxwell's mission is the destruction of SE. Not only in *Universe*, but throughout his philosophical triptych, Maxwell fights SE as if his life depended on it — his work certainly does. The salient, but rarely mentioned, fact about science that destroys SE is that scientists instantly *reject* "aberrant" versions of scientific theories that are equally well, or even better, supported by the evidence than their "normal" originals; scientists *accept* only "normal" theories. Examples of aberrant theories are a version of Newton's theory of universal gravitation that only differs from Newton's in that it asserts an inverse-cube-law for golden spheres having a mass of at least 1 million tons, a "Goodmanian version" asserting that after 2100 AD the gravitational force becomes an inverse-cube force, and a "Humean version" saying that after 2100 AD, the gravitational force disappears altogether (*Universe*, pp. 51–52). For every "normal" theory, there is an infinitude of aberrant versions. The aberrant versions do not even enter the scientific competition of Acceptance & Rejection, *their empirical virtues notwithstanding.* This proves the overriding importance of being normal, thus Maxwell concludes. The more silly one finds these aberrant versions, the more silly one ought to judge SE because SE forces one to take these aberrant versions seriously and often even to prefer them over their normal originals.

Fair enough. The behavior of scientists flatly contradicts SE. So who defends this false conception of science? Who is the enemy?

SE is the official ideology of science, allegedly characterizing the very nature of science in the eyes of the scientists, Maxwell submits. "SE is implicit in what is taught and discussed in science" (*Universe*, p. 43). Scientists believe that allowing non-empirical factors to intrude in the difficult process of judging scientific hypotheses and theories would be an act of betrayal, leading one astray from science, into philosophy, metaphysics, or perhaps worse. Maxwell hopes that *Universe* makes scientists see the light, so that they dispense with paying lip-service to a false ideology — and, presumably, spread the gospel of MR among their students. In spite of the disappointing fact that Maxwell does not present lists of references of exhortations of SE by scientists (Poincaré

and Planck, who passed away some time ago, are the only ones mentioned), I am prepared to give him the benefit of the doubt. Anyone who asserts that the Republic of Science is governed by the facts and nothing but the facts and declares that science is *not* in the business of making metaphysical theses about the nature of the universe is making statements about science that generally will be met with nodding approval from scientists despite the fact that such statements are as false as statements about science can be.

But I withhold the benefit of the doubt from Maxwell when it comes to philosophers of science, who, according to Maxwell, "persist in the hopeless endeavor of trying to justify the unjustifiable doctrine of SE" (*Universe*, p. 43). Maxwell mentions Popper, Kuhn, and Lakatos as friends of SE—all of whom are unfortunately dead now. The only living philosopher of science Maxwell mentions as a defender of SE is B. C. van Fraassen. This charge by Maxwell is, however, mistaken (Muller, 2004).

Anyhow, we ought to take the refutation of SE as a Popperian instance of the growth of our philosophical knowledge about science — a refutation that I take to be an insight of everlasting importance. But is this refutation sufficient motivation to embrace MR? According to Maxwell, more-or-less so, because the "aberrance-argument" does more than refute SE. It reveals that the scientific community implicitly accepts a substantial, permanent metaphysical thesis about the nature of the universe, namely that *the universe is such that every single aberrant theory is false*, or at the very least *empirically false* (fails to save the phenomena, false in so far as it talks about actual observables only). Maxwell will not hear of purely pragmatic stories in favor of the instant rejection of aberrant theories and the adoption of only normal ones. Such stories are philosophical fairy tales. Scientists reject aberrant theories not because they are "inconvenient" (they are not), "simple" (a matter of personal taste?), or whatever, but because they hold that such theories are at least empirically false (until proven wrong, of course).

Now, what is so terribly important about this admission? Well, it is a *realist's* confession and therefore philosophically important. Maxwell purportedly has led us to the conclusion that only some brand of metaphysical realism can make sense of science.

Here Maxwell is trying to make too much philosophical mileage with his aberrance-argument. Van Fraassen's partly anti-realist conception of science, with its crucial distinction between pragmatic acceptance and epistemic belief, can equally well do justice to the behavior of scientists. A constructive empiricist can *accept* the thesis that the universe is not what every aberrant theory says it is and can *believe* that aberrant theories are *empirically false*, i.e., false in so far as they talk about actual observables; the acceptance of this thesis can be justified by arguing that the thesis is expedient for science in achieving its *epistemic aim*, which is the construction of empirically true scientific theories. Perhaps this is a tall story, but it is certainly not a fairy tale — and *if* it is, Maxwell has not shown it (Muller, 2004).

Hence, my conclusion is that Maxwell's aberrance-argument leads us out of SE once and for all, but it does not lead us unavoidably to Maxwell's brand of metaphysical realism (MR) because there is at least one rival conception of science, i.e., Constructive Empiricism, which is well equipped to deal with the aberrance-argument.

2.2. Justification

MR is sufficiently justified as the currently best available conception of science if and when it solves the major philosophical problems of science today that other competing conceptions of science do not solve. Maxwell selects ten problems where MR cries victory over its competitors; this "provides decisive grounds for rejecting SE and accepting MR in its stead" (p. 45). I list the first five, which seem by far the most important.

(i) Practical Problem of Induction: why do we apply unrefuted yet empirically successful theories and rely on them with our lives, e.g., in building bridges, cars, and airplanes?
(ii) Methodological Problem of Induction: what methods does science employ to select theories (which always include generalities) on the basis of a finite number of particular facts?
(iii) Justificationary Problem of Induction (Hume's Problem): how do we justify these methods?
(iv) Semantic Problem of Simplicity: what does "simplicity" mean?
(v) Justificationary Problem of Simplicity: how do we justify the persistent preference for simple (hence, normal) theories and our persistent rejection of non-simple (hence, aberrant) theories?

Of course, for several of these problems, other solutions than Maxwell's have been proposed, developed, and hotly debated over the past decades. Whenever Maxwell mentions some such solution, he either scrutinizes it and then criticizes it as being no sensible solution after all, or, if it does look like a sensible solution after scrutiny, he points out that it fails to solve (most of) the *other* problems on his list. In the end, Maxwell always wins.

Problems (i)–(v) constitute the problem of what the criteria are for choosing a theory or hypothesis and how to justify these criteria. This is *ad fundum* the problem of scientific rationality, and it shows how broadly Maxwell construes the problems (iv) and (v) of "simplicity", i.e., to cover all non-empirical conditions (explanatory power, conceptual coherence, parsimony of ontology, elegance, etc.); their solutions entail solutions of the problems (i)–(ii) and (iii) of induction, respectively. Hume's problem and Goodman's riddle are, in fact, only two instances of an infinitely more general problem, call it *Maxwell's Problem: how do we justify our persistent rejection of aberrant theories and our acceptance of only normal theories?* The formulation of this more general problem is another of Maxwell's philosophical insights of importance (the justificationary problem of simplicity (v) thus comprises Maxwell's problem).

These are pressing problems indeed, as is problem (viii) of what constitutes scientific progress (not mentioned in the short list above). From here on, I restrict my attention to the problems (iv) and (v) of simplicity.

Like all authors who write about the subject of simplicity in physics, Maxwell first performs the ritual of explaining that simplicity cannot reside in mathematical form. The only way to make simplicity (unity, etc.) a substantial concept, which does justice to how in particular physicists deploy it, is to look at the content of scientific theories. We must look at *what* a theory asserts about the universe, not at *how* it is asserted. The subjects of metaphysics and ontology thus become unavoidable when discussing simplicity. Maxwell defines one theory to be *simpler* than another iff it exemplifies the current ontology (level 3 in the hierarchy of MR) better than its rival. There are several ways in which it can do that, with the result that variations of one theory may be seen as simpler than others. This seems to do justice to the complexity of scientists' judgments about the simplicity of theories. If MR is adopted antecedently, this definition solves (iv), the semantic problem of simplicity, as well as (v), the justificationary problem of simplicity and hence Maxwell's Problem, in the same strike. For example, Newton's theory of universal gravitation (call it NG) is simpler than a rival that states aberrant behavior of very heavy golden spheres (NG*) because, at the time of the inception of NG, the then-current mechanistic ontology did not make any exceptions with regard to the behavior of matter for heavy golden spheres. This explains why the scientific community of the 17th century would have preferred NG to NG* if it had been confronted with NG*. In general, all aberrant versions of NG exemplified the mechanistic ontology less than NG did — in spite of the fact that NG and all its aberrant versions are *inconsistent* with the mechanistic ontology because of the presence of *actio in distans*.

This is a neat idea. But it seems to replace the problem, because we now feel compelled to ask: why did the then-current mechanistic ontology make no exceptions for heavy golden spheres? MR has two possible answers to offer. The first is that when *it* became accepted, *it* was the best available exemplification of the *then*-current ontology *it* replaced; the second is that *it* exemplifies best a thesis higher up in the hierarchy of MR, which rules out exceptional behavior of particular types of objects such as heavy golden spheres. The first, *historical* answer is weak because the fog of history provides no firm grounding for anything. The historical answer boils down to saying: science does so because it did so in the past. The second, *rational* answer replaces the problem to the next level. In that case, a vicious circle is avoided, but we have an equally vicious helix *if* the thus resulting chain of arguments is not firmly grounded at some point. This grounding happens when we reach the transcendental levels in the hierarchy of MR. Ultimately Maxwell argues that we must assume metaphysical principles that rule out aberrant theories in order for science-as-we-know-it to become possible. Scientific progress would come to an end if we were to test all aberrant versions of some normal theory experimentally (*Universe*, pp. 192–193).

But transcendental arguments generally are not very good justifications. Suppose someone holds a shotgun against my head and orders me to cut off my fingers in thin slices and eat them together with my toenails that I have to remove with a pair of

pincers. Suppose I ask why I must perform this painful ritual. It is not a very illuminating answer to say that performing it is a necessary condition for my survival, the truth of the answer notwithstanding. If this were a good justification, then we might as well argue similarly that using induction is a necessary condition for the possibility of science and then claim we have solved Hume's problem. Such an argument would not be a solution of (iii), the problem of induction; it would only highlight the problem.

Besides this, has the vicious Millian circle of justifying induction by making an assumption that can only be grounded inductively really been avoided? Are the theses of the comprehensibility of the universe (the hierarchy of MR) really distinct from J. S. Mill's principle of the uniformity of the universe? Maxwell answers in the affirmative by claiming that his transcendental arguments are "a kind of justification which makes no appeal to *the success of science* and thus entirely avoids the above fallacy" (pp. 167–168). I beg to disagree. If Maxwell argues that the success of science (or the acquisition of knowledge, or other semantic sibling expressions) becomes impossible if we have to test every single aberrant version of a proposed normal theory rather than wipe them all off the table in a single sweep, he is establishing a conditional statement: if the success of science is to be possible, then aberrant theories have to be dismissed without testing them. But to have the consequent of this conditional, Maxwell needs the antecedent. Of course, *we want* the success of science to be possible, but *is* the success of science possible? That is the question. Clearly science *is* successful, and it is a modal-logical tautology that if p, then it is possible that p. But now we need *the success of science* as a premise. The helix turns out to be a deformed circle.

This conclusion is confirmed when we consider the content of the theses that are supposed to solve Hume's Problem. This is the level-9 principle of "epistemological non-maliciousness": knowledge obtained and tested in our (at most, Earthly) environment can be extrapolated to the entire universe. Clearly, this is a kind of induction which makes solving Hume's problem on the basis of this level-9 principle definitely circular. Maxwell hopes to avoid this Millian circle by arguing that it can only help science to accept the principle of epistemological non-maliciousness and never hinder it; therefore, it is rational to accept it (*Universe*, pp. 188–190). This is exactly similar to the act of desperation that Pascal committed in his wager to justify his belief in an after-life. Again, we might as well say that it is justified to use induction because using it can only help and never hinder the growth of science (glossing over the fact that theologians regard Pascal's wager as an insult). This looks like a Millian circle to me, because in this terminology, Hume's problem reads: why does induction help and never hinder?

2.3. Quantum mechanics

The final chapter of *Universe* is devoted to one physical theory in particular, namely quantum mechanics. Maxwell argues that standard quantum mechanics *ought to have been rejected* for various reasons. Surprisingly, one reason is that quantum mechanics is an aberrant physical theory. Here MR enters the picture. By

his own admission, Maxwell is saying that here MR is not able to make sense of physics-as-we-know-it — because MR advises us to reject all aberrant theories. Rather than conclude that MR now stands confuted as a conception of science, Maxwell launches a revisionary programme *to change physics* in order to make physics comply again with the precepts of MR (pp. 228–229). This sounds perhaps more revolutionary than it is because what it means is that Maxwell is propounding a particular interpretation of quantum mechanics that he hopes will replace the standard Copenhagen-like versions in the textbooks of physics — a dream he presumably shares with all propounders of an interpretation of quantum mechanics different from the standard one.

Maxwell presents his interpretation as similar to the well-known theory of Ghirardi, Rimini, and Weber (GRW) (1986) — when the last-mentioned appeared on the scene, the afore-mentioned was already fifteen years old (see Maxwell, 1972) — but instead of explicitly amending the Schrödinger equation, he lays down a Condition, which when fulfilled, makes him postulate that all summands but one in the superposition of the state of composite physical systems decay instantaneously; an indeterministic jump occurs, with relative frequencies equal to the relevant probabilities provided by quantum mechanics (p. 249). The Condition is that the inelastic interaction between the subsystems becomes negligible, so that they evolve approximately like free systems. An accompanying assertion is that at the end of every measurement process, this Condition is met; if true, the notorious measurement problem looks solved. Without quantitative models of a few types of generic measurement processes, this assertion is, however, no more than just an assertion. Like GRW, Maxwell introduces a new constant of nature, called ε (a small, positive, *dimensionless* number), in order to quantify his Condition. Therefore, like GRW, Maxwell is propounding a theory that may differ empirically from quantum mechanics. But unlike GRW, who make the collapses occur spontaneously and almost instantaneously, independent of whether (certain types of) interactions are present, Maxwell makes his collapses occur if and only if his Condition is met. Seen in this light, Maxwell's interpretation is a halfway house between standard quantum mechanics and the quantum theory of GRW.

In fact, some of the weird features of standard quantum mechanics that GRW are able to eliminate survive in Maxwell's version, for they do not pass the Condition. Think of the spin-singlet state. This is a composite system of two non-interacting particles and fails to meet the Condition because no inelastic interactions are involved. How do we understand *physically* that one particle is, weirdly, in a superposition of a spin-state up and a spin-state down, and, even more weirdly, that each particle is in a superposition of kinematical states of flying in opposite directions? Maxwell remains silent whereas GRW argue that such a state does not persist over time — it only exists for a negligible amount of time. Why does Maxwell regard this not "bafflingly incomprehensible" (p. 228)?

If one is prepared to alter the dynamics of standard quantum mechanics in order to solve the measurement problem, to introduce a new constant of nature, and to have no qualms about destroying the beautiful Wignerian symmetry-connection between the Schrödinger-equation and the Galilean structure of the ambient

space-time, there seems no virtue in stopping half way. If the sacrifice is made, then one should try to squeeze the most out of it, which is precisely what Maxwell has not done.

My overall conclusion is that *Universe* is an ideal book for a reading group in philosophy of science or in philosophy of physics. Many of the pressing problems of the philosophy of science are given lively discussion, controversial solutions are passionately defended, and some new insights are provided; in particular, the chapter on simplicity in physics deserves to be read by all philosophers of physics — the critical tone of my discussion of some of Maxwell's claims should not cloud these valuable facts but should be understood as a corroboration of them.

3. Metaphysical dualism

As the subtitle of *Human* says, this book is about consciousness, free will, and evolution. This time, the enemy is every single philosopher who has ignored what might be called *the hardest problem*. It is "the central, fundamental problem in philosophy" (*Human*, p. 3):

> For if we are merely extremely complex physical phenomena, how can our lives have any meaning or value? How can our inner world of sensations, feelings and thoughts exist? How can we be sentient and conscious? How can we have mind or a soul? How can we control, and be responsible for, what we think, decide and do if all that we do and are unfolds in accordance with precise physical law?...How can anything that gives meaning and value to our life exist if we are in reality nothing but complex physical phenomena?

The hardest problem also shows its face in religion, Maxwell argues, where it is the problem of how to reconcile the hypothesis of an omnipotent, benign creator with the enormous and continuous suffering in the world (*Human*, pp. 6–10). The flourishing of the philosophy of mind over the past decades Maxwell welcomes as a sign that the philosophical community is coming to its senses. No lonely wars here anymore.

The core of Maxwell's solution to the hardest problem is as follows: there are, as a matter of brute fact, to be accepted bluntly, "two aspects to what exists, the physical on the one hand, and the mental, experiential, or human, on the other" (*Human*, p. 11). This emendation of Cartesian Dualism *prima facie* does not look very promising: it will lead to re-statements of all the problems that haunt Cartesian Dualism rather than providing solutions to these problems, in particular to the mind-body problem (nowadays called "the hard problem"). Maxwell is too good a philosopher not to recognize this, but he has little inclination to belabor the point. Instead, he quickly goes on to argue that his view is a considerable improvement on Cartesian Dualism and is vastly superior to competing views, notably varieties of Idealism (Kant, Berkeley) and of Reductionism (Smart, Dennett, Kim). The two sides of the hard problem that Maxwell is willing to face are: *first*, how to understand the mental and the place of the mind in nature, in particular in the light of the fact

that everything *science* seems capable of doing is to explain and to describe the brain better in a completely mindless way; and, *secondly*, how to understand the interaction between the mental and physical, between the mind and the brain, in particular the place of free will in a universe governed by natural law. Seven of nine chapters of *Human* deal with expounding the solutions to these (and related) problems and in criticizing rival solutions. We take a quick look at these two sides of the hard problem.

3.1. The problem of the place of the mind in nature

There are two distinct aspects of what there is and there are, Maxwell argues, two concomitant realms of explanation and understanding that are mutually exclusive and jointly exhaustive. The better we understand something mentally, the poorer we understand it physically, and conversely. Physical understanding, or, more generally, scientific understanding, involves causality, deductive arguments and quantitative modeling, whereas mental understanding is a combination of imitation and imagination, which are mental activities. Someone who wants to explain and understand the mind scientifically is making a category mistake and is embarking on a doomed enterprise. Thus rather than a *solution* to the hard problem, Maxwell provides a *dissolution* of it.

Why do these two aspects exist—the mental and the physical? Maxwell has no answer. Was the physical there before the mental? Yes. How did the mental come into existence? To this question, Maxwell sketches an evolutionary answer. Consciousness has evolved *gradually* in living organisms because it provided enormous evolutionary advantages. "Life unknowingly breeds itself into existence" (p. 174). Darwin was not only a scientist, he was also a philosopher, for the theory of evolution explains the gradual development of purposiveness (living is goal-pursuing) in a purposeless universe, and this explanation contributes to a solution of the hardest problem, which is a philosophical problem.

3.2. The problem of physical-mental interaction

The processes that occur in our heads ("head-processes") have a brain aspect and a mind aspect. Maxwell declares neurological processes in the brain and mental processes of the mind, inner experiences, to be "contingently identical" (pp. 16, 102). This is intended in the same sense as saying that water is contingently identical to H_2O, that temperature is contingently identical to the motion of molecules, etc. Thus, the mind and the brain are contingently identical. Asking, then, how the mind can interact with the brain is asking how water can interact with H_2O. It is a stupid question. The hunt for a *solution* to the hard problem is often tacitly supposed to be understood as asking for an *explanation in the sense of science* of how the mental and the physical interact. This is chasing a red herring because it denies the fundamental distinction between the mental and the physical and concomitant fundamentally different ways of explanation. There can be no such thing as an explanation that jumps back and forth from one realm to another.

I find this dissolution difficult to understand. If there are two fundamental, *distinct* aspects of head-processes, then to declare them identical (contingently or not) seems to be a contradiction because identity entails analytically *non-distinctness*. What is meant by saying that water is contingently identical to H_2O is that it happens to be a fact in this world that the concepts of water and H_2O have an identical referent; they are different names for the same thing. But does Maxwell really mean to say that mental processes and brain-processes are two different names for the same thing? If that same thing is ''head processes'', then do we have *three* names for the same thing? If mental processes and brain-processes are two distinct aspects of the same thing, namely head-processes, then these two concepts must refer to distinct aspects of head-processes, not to one and the same aspect, for then we are heading for either idealism or reductionism, both of which Maxwell rejects. Furthermore, what chemistry and solid state physics teach us about collections of H_2O molecules explains all the properties of water we are familiar with; but what neuro-physical and biochemical research tell us about the brain does not, and cannot, explain anything about mental processes, for Maxwell has allotted them to mutually exclusive realms of explanation.

To the generic reader of this journal, I recommend reading *Human* nonetheless for a number of reasons. First, *Human* is the centerpiece of Maxwell's philosophical triptych: in Chapter 3 and Appendix 3, the left panel, *Universe* is summarized, and in Chapter 9, the right panel, *Wisdom* is summarized (it deals with a New Enlightenment programme and the consequences of philosophy for society as a whole). Therefore, *Human* provides the best entrance to Maxwell's world of thought. Secondly, *Human* contains a succinct but certainly not too-detailed overview of the various problems and positions in the currently flourishing philosophy of mind. Thirdly, it shows that despite the fact that many philosophers have declared Cartesian Dualism dead time and again, with some adjustments, the Cartesian view remains powerful and can compete effortlessly with other extant views — think also in this respect of Searle's work.

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