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I

Religion and science: strategies, definitions, and issues

I. INTRODUCTION: A VARIETY OF STRATEGIES

Mountain peaks do not flow unsupported; they do not even just rest upon the earth. They *are* the earth in one of its manifest operations. (John Dewey 1934, 3)

Humans too 'are the earth in one of its manifestations'. We are part and parcel of nature. Our mental life, consciousness, and culture, our sciences and our religious convictions 'do not flow unsupported', nor do they merely 'rest upon' our physical constitution. We are natural, limited, biological beings. This has consequences for our self-understanding, our views of human religion and science included.

We are atoms and molecules, but we are not just piles of them. We are much more structured and shaped. Reality allows for a rough division into levels of complexity, from quarks to atoms, and from molecules to organisms and cultures, and our knowledge ranges accordingly from physics and biology to the social sciences and humanities. Religion and morality belong to the 'highest' level, that of human persons, cultures, and traditions. However, that level does not 'flow unsupported', but is rooted in, or rather a manifestation of, the rich possibilities of the natural world. In this study I seek to articulate such a view of reality and attempt to think through perspectives for religion in a world best understood in scientific terms. In chapter 1 I will articulate my understanding of the main partners, that is, of science and the naturalist view of reality which, in my opinion, is the most adequate interpretation of the sciences [2], and of religion [3]. After these reflections on the partners and on definitions of central terms, we come to discussions about the relationship between science and religion [4, 5]. But first, we will consider some strategies for dealing with religion in relation to the natural sciences.

My strategy with respect to the sciences is in contrast with various other interpretations of the natural sciences.

(1) Some *play down science* in order to make room for existing beliefs. In their opinion, science offers knowledge which may be instrumentally useful, but this knowledge is not significant when it comes to matters of meaning, where we have to turn to subjective experience and interpersonal relations. Either the status of scientific insights or the extent of the domain of science is supposed to make the sciences irrelevant for reflections on religious life. With such thinkers I agree that religion and science are quite different enterprises. However, humans are part of the natural world; the sciences may well have something to say about interpersonal relations and subjective experiences too. At various places in this study I will attempt to make it clear that such modest, *agnostic views of science*, with respect to its domain and the nature of its claims, underestimate the scope and strength, and thus the relevance of the natural sciences.

(2) Others do not so much play down science, but rather embrace it while arguing that the sciences result in a 'holist' or 'organic' view of reality, which incorporates notions such as values and feelings. In some such approaches the standard disciplinary order of the sciences is rejected, and mental or personal phenomena are taken to be more basic than physical ones, or at least equally fundamental (e.g., process metaphysics, as inspired by Whitehead). Reality is seen as more meaningful than the dominant, physicalist view of the sciences seems to suggest. I will argue that such *romantic or metaphysical interpretations of science* are, if not at odds with the best available knowledge, unwarranted when they postulate more fundamental entities or relations than one needs to account for all our experiences.

(3) In this study I opt for an interpretation of the sciences which takes them very seriously (though cautiously so, since current scientific theories are not final) and as relevant to our understanding of the natural world, humans included (against 1). I accept the current disciplinary structure of the sciences, which gives physics a prominent place when it comes to the most basic laws and constituents of reality, while life and consciousness are taken to be phenomena which depend on complex organisations and are studied by 'higher-level' sciences such as biology and psychology. The sciences say what they seem to say; the interpretation need not always be obvious or unique, but a radical reinterpretation and reshuffling of the sciences allows more

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liberty from accepted scientific practice than I consider warranted (against 2).

Among those who take the sciences as relevant and as saying what they seem to say, various positions with respect to religion can be found.

(a) Some authors give the sciences full reign in the domain of knowledge, and conclude that science has made all religion futile. I agree with them on the primacy of science in the realm of knowledge; claiming science and religion as separate cognitive enterprises of equal status is too easy. I also agree on a sober rather than a romantic naturalist framework as the best interpretation of modern science, and conclude that science challenges religious views. However, contrary to *polemical anti-religionists*, I hold that religion continues to be an important phenomenon in our reality. Even when religion is explained, if ever, it will not thereby be eliminated even though it will have to change. Furthermore, I will argue that a naturalist understanding of phenomena in reality leaves some questions about the framework as a whole open; questions which such authors dismiss too easily.

(b) This brings me closer to those who do science-and-theology in a way which takes the natural sciences seriously. However, within this approach I will distance myself from those who do *science-and-theology* as if science offers evidence for divine design, as if there is room for particular divine actions within the natural world, or as if we have two enterprises of equal cognitive status which need to be integrated. In my opinion, such a position runs the risk of demanding 'less than it could of theologians and more than it should of scientists' (Eaves 1991, 496). It demands more than it should of the scientists since such an approach threatens the coherence of the sciences; this coherence I articulate in the notion of 'naturalism' [see below, 2]. Equally important, if one relates scientific understanding *of the world* to theological convictions [chapter 3], without taking into account scientific insights *about human nature* [chapter 4], one demands less than one *should* of theologians. I have two reasons for this position.

(i) We should not combine a sophisticated understanding of physics with a pre-scientific understanding of human nature, for example, by talking about mind, subjective experience, affections, or decisions without taking into account the way such aspects of personal life are rooted in our constitution. In our anthropology, which is essential to any theological position which is existentially relevant, we should take the appropriate sciences into account. A jump from quantum physics

to the self, or from non-linear thermodynamics and chaos theory to human nature is inadequate since it bypasses many relevant 'intermediate' disciplines such as neurophysiology, behavioural genetics, and sociobiology [22–6, 28].

(ii) Theologians not only have to develop a view of creation and providence which does not conflict with the evolution of species and our knowledge of physical processes. They also have to take into account that religious beliefs and interpretations arose in various historical and pre-historical circumstances. That such beliefs arose in certain circumstances does not imply that they must be wrong, but their historical contingency in relation to human history and human nature raises the question of why we would consider particular beliefs of an earlier epoch as serious candidates for truth or as existentially relevant insights, worth reformulating in our time. Translating theological convictions into new terms by finding new models and metaphors is, in my opinion, inadequate if questions concerning the evolved, historical character of human religious traditions are passed by.

Whether theologians can respond adequately to these insights, is something that depends on the criteria by which one evaluates the results of projects like the one undertaken here. I will articulate a minimum number of elements which I consider essential [3], and seek to argue in this book that these can find a place in a naturalist view of reality.

My approach is minimalist with respect to religion (Stone 1992), but this is, in my opinion, a consequence of taking science seriously. The challenges from the sciences to religion are such that significant *changes* in our understanding of religion are called for. Religion is too important to leave to conservatives who attempt to save faith by keeping science at bay with the help of formal arguments, by rejecting science, or by replacing it with a reconstruction of their own. The rise of conservative positions, both inside and outside the Christian churches, is 'a sign not so much of a recovery of faith as of a loss of nerve before the onslaught of new perceptions of the world' (Peacocke 1993, viii). Theologians and other thinkers about religion should not be satisfied with less than honestly facing the challenges. The hope, and for Gerd Theissen (1985, xi) the 'surprising experience', is 'that precisely when we refuse to stop short at the innermost "sanctuaries" of the tradition with our modern scientific questioning, the tradition shows up in quite a new light'. I am less confident about this 'new light'

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than Theissen. However, whatever the outcome, intellectual honesty compels us, in my opinion, to take science with utmost seriousness, since it is the joint, cumulative and successful enterprise of many individuals.

By arguing for a naturalist view of religion, for the importance of religion, and for the persistence of limit questions despite the success of the scientific understanding of reality, I will probably offend persons in opposite camps: both those with a more traditional view of religion and those who totally dismiss religion. Many adherents of these two opposite positions share a static cognitive understanding of religion, which is challenged here. Just as politics is too important to leave to extremists on the left and the right to define the issues, so too are religion and science too important to leave their fates to conservatives and eliminators.

This book serves two purposes. One objective is to provide a survey of various positions on, and of issues in, the relationship of religion and science – many of which merit further attention. This survey has to be selective and limited in view of the second goal: the articulation of my own position, and its defence against various challenges, some of which arise from the other positions considered. Though the book presents a personal perspective, I hope that those who do not share my position will none the less find the reflections on various challenges to religion in relation to the natural sciences relevant. The following is an argument, but it is also a map, providing an overview which may be useful whatever the direction in which one may intend to go.

If one were to study all individual trees at length one would not notice the forest. The analysis of the positions of individual authors may leave much to be desired; a complete presentation of each view would have to be much more nuanced. Besides, there are important books which have not been considered, and British and American authors have received much more attention than authors from the European continent. I apologise for any biased representations. However, the aim of this book – an argument about the field as a whole – is at odds with a detailed analysis of individual authors or single issues and with the attempt to be complete.

The focus is on Christianity as it is prominent in Western Europe and in the United States of America. This is not in any way based upon an informed judgement about the value of other traditions. Some

limitation is necessary to acquire some depth with respect to the area chosen. The particular limitation and approach adopted here are contingent upon my own background and context, that of a late twentieth-century Dutch academic, who was raised in a religiously liberal and politically social-democratic atmosphere, who was trained in one of the natural sciences, and whose primary professional responsibility is intellectual rather than pastoral. Whether a similar analysis could be made in other contexts, would have to be considered by persons more versed in other traditions.

There may not be a neutral, objective stance; even the mixture of empirical and analytical attitudes assumed here is the product of tradition, namely of the intellectual traditions of modern science and of the European Enlightenment. This tradition has moral and intellectual merits in its ideal of an impartial view and in its intended attitude to put any assertion as much as possible to the test, and therefore its willingness to abandon any belief if it were to fail seriously. This tradition is not neutral, maybe not even self-referentially consistent, as problems of tolerance with respect to intolerant ideologies and persons show. However, as a moral and intellectual tradition it is mine, and that of many others both within and outside the churches in Western Europe and North America. It is in that spirit of inquiry that I offer the following reflections on religion in relation to the natural sciences.

2. SCIENCE AND NATURALISM

The 'Legend' was, and in some circles still is, that science discovers *the* true story of the world by using *the* scientific method (Kitcher 1993, 3). This view has come under attack during the last three or four decades. Studies of actual science showed that some successes had been achieved by violating officially acknowledged methods. Subsequent scientific accounts and paradigms were shown to exhibit substantial discontinuities, even though each story was in its time held to be almost, approximately, or partially true. The relevance of social relations among scientists and between scientists and the wider community to the development of science has been brought to light. Such studies have led to criticisms of the traditional view of science.

One possible response to the criticism of the legendary view of science is to question and dismiss science. Another possible response is to conclude that we should develop a better understanding of science

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in the conviction that ‘Legend offered an unreal image of a worthy enterprise’ (Kitcher 1993, 5). I take the latter course. The epistemic status of science can be defended even while the importance of the social dimensions of scientific practices and the reality of discontinuities in the history of various disciplines is accepted. This position can be argued for in a general way on the basis of our successes in manipulating the world and in unifying our understanding. More specific arguments come from detailed studies, for instance of the social dimensions in consensus formation and of continuities and discontinuities during various historical transitions. P. Kitcher’s *The Advancement of Science* offers, in my opinion, a promising example of such a revised view of science. He concludes:

Flawed people, working in complex social environments, moved by all kinds of interests, have collectively achieved a vision of parts of nature that is broadly progressive and that rests on arguments meeting standards that have been refined and improved over centuries. Legend does not require burial but metamorphosis. (Kitcher 1993, 390)

A few characteristics of the understanding of science that lies behind my approach:

a. Science is taken in a *realist* way in the sense that it is supposed to study a reality which is to a large extent independent of humans, and even more independent of human attempts to find out about reality. However, science is not restricted to phenomena which are independent of humans. Even though large parts of the biosphere have been modified by humans, a biologist can still study an ecosystem as a reality which precedes her current study. A recently discovered class of materials which exhibit superconductivity at relatively high temperatures exists, as far as currently known, only in so far as these materials have been made by humans in laboratories. However, a physicist who studies these materials after producing them still investigates a reality ‘out there’, even though that reality has been constructed. Even the study of human consciousness by physiologists and psychologists, to take another example, is in many cases the study of other persons, and if it is self-reflection there still is the assumption that the reflection concerns one’s own inner feelings and thoughts – a reality on which one reflects.

b. However, such a realism does not carry us very far in debates on *scientific realism*, which are, in my view, not debates about the existence

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of 'reality out there' but debates about the quality of our knowledge. Do our terms refer to entities out there? Can we say that these entities exist? Do our theories express relations between entities out there? Or, less generally, which theories, or which elements in our theories, can we take seriously as 'depicting' the way reality is, and to what extent? What criteria should we apply when we attempt to answer such questions? Are there mature sciences in which there is convergence to a true account of the world? Unqualified realism, in the sense that we take all our current theories to be the truth, or at least part of the truth or increasingly better approximations to the final truth, seems too strong, and thus too vulnerable to criticisms. Scientific explanations and concepts are provisional human constructs organising the natural world; they are not wholly independent of human intellectual capacities, social interactions, and contingencies of history.

Debates about realism sometimes become heated due to conflation of this debate about the quality of our knowledge with the debate about the existence of reality out there referred to above (a), especially when the dispute concerns not only the knowledge and existence of ordinary reality but also knowledge about, and the existence of, God. To some extent this conflation of the two debates on realism is to the point when it comes to religious issues, since the consequence of a certain view of our knowledge (the second debate, b) may be that one has a low regard for the belief that religious terms refer to a particular existent with the characteristics ascribed to God without, however, challenging the existence of reality as such; perhaps the religious terms are understood psychologically or sociologically [see below, 20, 22, 24]. To meet the challenge of a non-realist understanding of religious terms, a general defence of realism in the first sense (in contrast with idealism, [17]) is insufficient, since the challenge concerns not so much the existence of a reality, but rather the nature of that reality.

c. One major characteristic of the sciences is their wide *scope*; their domain seems to be without obvious boundaries. In the course of history, terrestrial physics turned out to be applicable to heavenly phenomena as well, and chemistry can be applied to all processes in living beings. The domain of the sciences extends from the smallest objects to the universe at large, from extremely brief phenomena to the stability of rocks, and from heavy objects to massless light. The same physics and chemistry seem to apply everywhere and at all times.

d. Correlated with the extension of science is the inner *coherence* of our scientific knowledge. While I do not claim that theories in one science, for instance biology or chemistry, can be exhaustively reformulated in terms of another science, such as biochemistry or physics, the coherence between different sciences has proved to be a heuristically fruitful guide in the development of the sciences, and, if temporarily strongly violated, has at least re-established itself as a result of later scientific developments.¹ Coherence has become a criterion which makes us reject, or at least consider with the utmost suspicion, purported knowledge which stands in splendid isolation, even if it does not conflict with the rest of our knowledge. This coherence is such an effective heuristic guide that I take it to be informative about the reality with which our knowledge deals, but I will articulate that when we come to 'naturalism'.

e. Science *enlarges and changes* our view of the known world.² In science there is more risk involved than in formal demonstrations (as in mathematics) since the scientific theories are not in a strict sense implied by the data. The development of scientific theories is also more risky than induction or extrapolation, since theories may postulate entities and concepts of a kind not found in the data; theories are more than generalisations of facts. The debate about scientific realism (see above, b) can also be interpreted as a debate about the way we should consider the theories of science given the 'risk' involved in the process by which we come to these theories: is the process to be understood as a form of inference on which we can rely (and to what extent and for what purposes)? Whatever we think of the realist status of scientific theories, they offer us *scientific images* of the world which *differ* from our

¹ The coherence need not have been heuristically fruitful at all moments in the history of science, as J. H. Brooke pointed out to me with the help of some examples. For instance, in the late nineteenth century there was no coherence between the best physical estimates of the time available for terrestrial evolution (e.g., Kelvin calculated on the basis of known sources of energy a solar lifetime of approximately 20 million years) and the time assumed in evolutionary biology and geology. Too stringent opinions on coherence would have hampered the development of biology. However, in this case coherence was established later, with the discovery of nuclear fission and fusion. Coherence can also be artificial and unfruitful, for example by making too facile claims about similarities and relations between quantum and mental phenomena; this would be a claim to coherence which leaves out many relevant 'intermediate' disciplines, such as the neurosciences and thus is not the kind of coherence referred to in the text.

² The expression that science enlarges our view of the known world has been taken from the title of an essay by McMullin (1994); see also (McMullin 1992, 92), where he argues that the scientific 'process as a whole is the inference by which we transcend the limits of the observed, even the instrumentally observed'.

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manifest images (Sellars 1963). This is especially relevant when we consider religion, since religion is in general intimately related to manifest images. This has to do with the importance of tradition for religion, and hence that of symbols and myths from earlier times. It has also a 'public relations' side, since most religions reach out to a wide audience which understands and relates to manifest images more easily. The difference between manifest and scientific images is also conceptually important. For instance, our concept of a person (with an inner life, emotions, responsibilities, etc.), as it is central to most religious views, is rooted in our manifest images of the world.

f. Contemporary natural science is *stable and provisional*. It is stable in the sense that many branches of science seem to be cumulative, building upon knowledge acquired in the last few centuries. Whereas there was a time when the existence of atoms was seriously disputed, it seems extremely unlikely that physicists and chemists ever will abandon belief in atoms and, for instance, in the periodic table arranging the various elements. It seems equally unlikely that biologists will abandon evolution, both as a view of the natural history of organisms and as a theory explaining this natural history in terms of transmission of properties (in genes) and of differences in survival and reproduction between various variants. However, science is also provisional, and this provisionality is not merely that we may extend our knowledge into new domains (for instance by creating and studying super-heavy elements), but also that we may reach a further understanding of domains already known, and thereby modify our views. For instance, our understanding of the particles that make up atoms (protons, neutrons) has changed; they now are taken to consist of quarks and gluons. And if one probes further, one comes into a domain where the physics is very speculative, and certainly not as stable as our belief in atoms.

Naturalism

Among those who intend to take science seriously, various views of the world may be found, but one of these seems to me to be the most adequate view of the world given contemporary natural science. It is this view which I label 'naturalism'.

There are at least two ways of using the label 'naturalism'. Strawson (1985, 38ff.) distinguishes between 'soft' or 'non-reductive' and 'hard' or 'reductive' naturalism. Upon the 'soft' understanding, naturalism refers to what we ordinarily do and believe as humans, say about colours,