# MIND & COSMOS

WHY THE MATERIALIST NEO-DARWINIAN CONCEPTION OF NATURE IS ALMOST CERTAINLY FALSE

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# CONTENTS

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# PREFACE

The two people who, in very different ways, have had the most influence on the thoughts expressed in this book are Sharon Street and Roger White. I was also much instructed and stimulated by the discussions of a research group on science and religion organized at the New York Institute of Philosophy with the support of a Mellon Foundation Distinguished Achievement Award, and I am grateful to the Mellon Foundation for making it possible. The group, which met from 2006 through 2009, brought together faculty and graduate students of the philosophy department at New York University with regular and occasional participants from other universities and other fields. Street and White were members of that group, and I would also like to thank in particular Paul Boghossian, Laura Franklin-Hall, Philip Kitcher, Matthew Kotzen, H. Allen Orr, Alvin Plantinga, Elliott Sober, and Michael Strevens. Sober also read the manuscript of the book for Oxford University Press, and offered useful suggestions. I presented some of the material at the Colloquium in Legal, Political, and Social Philosophy that Ronald Dworkin and I have conducted for many years, and I am grateful to him and to the other

participants for their help. In view of the unorthodoxy of the result, I hope these thanks will not give offense.

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New York, October, 2011

# MIND AND COSMOS

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*Chapter 1*

# Introduction

The aim of this book is to argue that the mind-body problem is not just a local problem, having to do with the relation between mind, brain, and behavior in living animal organisms, but that it invades our understanding of the entire cosmos and its history. The physical sciences and evolutionary biology cannot be kept insulated from it, and I believe a true appreciation of the difficulty of the problem must eventually change our conception of the place of the physical sciences in describing the natural order.

One of the legitimate tasks of philosophy is to investigate the limits of even the best developed and most successful forms of contemporary scientific knowledge. It may be frustrating to acknowledge, but we are simply at the point in the history of human thought at which we find ourselves, and our successors will make discoveries and develop forms of understanding of which we have not dreamt. Humans are addicted to the hope for a final reckoning, but intellectual humility requires that we resist the temptation to assume that tools of the kind we now have are in principle sufficient to understand the universe as a whole. Pointing out their limits is a philosophical task, whoever engages in it, rather than part of the internal pursuit of science—though we can hope that if the limits are recognized, that may eventually lead to the discovery of new forms of scientific understanding. Scientists are well aware of how much they

don't know, but this is a different kind of problem—not just of acknowledging the limits of what is actually understood but of trying to recognize what can and cannot in principle be understood by certain existing methods.

My target is a comprehensive, speculative world picture that is reached by extrapolation from some of the discoveries of biology, chemistry, and physics—a particular naturalistic *Weltanschauung* that postulates a hierarchical relation among the subjects of those sciences, and the completeness in principle of an explanation of everything in the universe through their unification. Such a world view is not a necessary condition of the practice of any of those sciences, and its acceptance or nonacceptance would have no effect on most scientific research. For all I know, most practicing scientists may have no opinion about the overarching cosmological questions to which this materialist reductionism provides an answer. Their detailed research and substantive findings do not in general depend on or imply either that or any other answer to such questions. But among the scientists and philosophers who do express views about the natural order as a whole, reductive materialism is widely assumed to be the only serious possibility.[1]

The starting point for the argument is the failure of psychophysical reductionism, a position in the philosophy of mind that is largely motivated by the hope of showing how the physical sciences could in principle provide a theory of everything. If that hope is unrealizable, the question arises whether any other more or less unified understanding could take in the entire cosmos as we know it. Among the traditional candidates for comprehensive understanding of the relation of mind to the physical world, I believe the weight of

1. For a clear statement, see Steven Weinberg, *Dreams of a Final Theory* (New York: Pantheon Books, 1992), chapter 3.

evidence favors some form of neutral monism over the traditional alternatives of materialism, idealism, and dualism. What I would like to do is to explore the possibilities that are compatible with what we know—in particular what we know about how mind and everything connected with it depends on the appearance and development of living organisms, as a result of the universe's physical, chemical, and then biological evolution. I will contend that these processes must be reconceived in light of what they have produced, if psychophysical reductionism is false.

The argument from the failure of psychophysical reductionism is a philosophical one, but I believe there are independent empirical reasons to be skeptical about the truth of reductionism in biology. Physico-chemical reductionism in biology is the orthodox view, and any resistance to it is regarded as not only scientifically but politically incorrect. But for a long time I have found the materialist account of how we and our fellow organisms came to exist hard to believe, including the standard version of how the evolutionary process works. The more details we learn about the chemical basis of life and the intricacy of the genetic code, the more unbelievable the standard historical account becomes.[2] This is just the opinion of a layman who reads widely in the literature that explains contemporary science to the nonspecialist. Perhaps that literature presents the situation with a simplicity and confidence that does not reflect the most sophisticated scientific thought in these areas. But it seems to me that, as it is usually presented, the current orthodoxy about the cosmic order is the product of governing assumptions that are unsupported, and that it flies in the face of common sense.

2. See Richard Dawkins, *The Blind Watchmaker: Why the Evidence of Evolution Reveals a Universe without Design* (New York: Norton, 1986), for a canonical exposition, which seems to convince practically everyone.

I would like to defend the untutored reaction of incredulity to the reductionist neo-Darwinian account of the origin and evolution of life.[3] It is prima facie highly implausible that life as we know it is the result of a sequence of physical accidents together with the mechanism of natural selection. We are expected to abandon this naïve response, not in favor of a fully worked out physical/chemical explanation but in favor of an alternative that is really a schema for explanation, supported by some examples. What is lacking, to my knowledge, is a credible argument that the story has a nonnegligible probability of being true. There are two questions. First, given what is known about the chemical basis of biology and genetics, what is the likelihood that self-reproducing life forms should have come into existence spontaneously on the early earth, solely through the operation of the laws of physics and chemistry? The second question is about the sources of variation in the evolutionary process that was set in motion once life began: In the available geological time since the first life forms appeared on earth, what is the likelihood that, as a result of physical accident, a sequence of viable genetic mutations should have occurred that was sufficient to permit natural selection to produce the organisms that actually exist?

There is much more uncertainty in the scientific community about the first question than about the second. Many people think it will be very difficult to come up with a reductionist explanation of the origin of life, but most people have no doubt that accidental genetic variation is enough to support the actual history of evolution by natural selection, once reproducing organisms have come into existence. However, since the questions concern highly specific events over a

3. For an illuminating account of Darwin's own views about the most basic forms of explanation, see Elliott Sober, "Darwin's Discussions of God," in *Did Darwin Write the "Origin" Backwards?: Philosophical Essays on Darwin's Theory* (Amherst, NY: Prometheus Books, 2011), 121–28.

long historical period in the distant past, the available evidence is very indirect, and general assumptions have to play an important part. My skepticism is not based on religious belief, or on a belief in any definite alternative. It is just a belief that the available scientific evidence, in spite of the consensus of scientific opinion, does not in this matter rationally require us to subordinate the incredulity of common sense. That is especially true with regard to the origin of life.

The world is an astonishing place, and the idea that we have in our possession the basic tools needed to understand it is no more credible now than it was in Aristotle's day. That it has produced you, and me, and the rest of us is the most astonishing thing about it. If contemporary research in molecular biology leaves open the possibility of legitimate doubts about a fully mechanistic account of the origin and evolution of life, dependent only on the laws of chemistry and physics, this can combine with the failure of psychophysical reductionism to suggest that principles of a different kind are also at work in the history of nature, principles of the growth of order that are in their logical form teleological rather than mechanistic. I realize that such doubts will strike many people as outrageous, but that is because almost everyone in our secular culture has been browbeaten into regarding the reductive research program as sacrosanct, on the ground that anything else would not be science.

My project has the familiar form of trying to meet a set of conditions that seem jointly impossible. In addition to antireductionism, two further constraints are important: first, an assumption that certain things are so remarkable that they have to be explained as nonaccidental if we are to pretend to a real understanding of the world; second, the ideal of discovering a single natural order that unifies everything on the basis of a set of common elements and principles—an ideal toward which the inevitably very incomplete forms of our actual understanding should nevertheless aspire. Cartesian dualism

rejects this second aspiration, and the reductive programs of both materialism and idealism are failed attempts to realize it. The unifying conception is also incompatible with the kind of theism that explains certain features of the natural world by divine intervention, which is not part of the natural order.

The great advances in the physical and biological sciences were made possible by excluding the mind from the physical world. This has permitted a quantitative understanding of that world, expressed in timeless, mathematically formulated physical laws. But at some point it will be necessary to make a new start on a more comprehensive understanding that includes the mind. It seems inevitable that such an understanding will have a historical dimension as well as a timeless one. The idea that historical understanding is part of science has become familiar through the transformation of biology by evolutionary theory. But more recently, with the acceptance of the big bang, cosmology has also become a historical science. Mind, as a development of life, must be included as the most recent stage of this long cosmological history, and its appearance, I believe, casts its shadow back over the entire process and the constituents and principles on which the process depends.

The question is whether we can integrate this perspective with that of the physical sciences as they have been developed for a mindless universe. The understanding of mind cannot be contained within the personal point of view, since mind is the product of a partly physical process; but by the same token, the separateness of physical science, and its claim to completeness, has to end in the long run. And that poses the question: To what extent will the reductive form that is so central to contemporary physical science survive this transformation? If physics and chemistry cannot fully account for life and consciousness, how will their immense body of truth be combined with other elements in an expanded conception of the natural order that can accommodate those things?

As I have said, doubts about the reductionist account of life go against the dominant scientific consensus, but that consensus faces problems of probability that I believe are not taken seriously enough, both with respect to the evolution of life forms through accidental mutation and natural selection and with respect to the formation from dead matter of physical systems capable of such evolution. The more we learn about the intricacy of the genetic code and its control of the chemical processes of life, the harder those problems seem.

Again: with regard to evolution, the process of natural selection cannot account for the actual history without an adequate supply of viable mutations, and I believe it remains an open question whether this could have been provided in geological time merely as a result of chemical accident, without the operation of some other factors determining and restricting the forms of genetic variation. It is no longer legitimate simply to imagine a sequence of gradually evolving phenotypes, as if their appearance through mutations in the DNA were unproblematic—as Richard Dawkins does for the evolution of the eye.[4] With regard to the origin of life, the problem is much harder, since

4. See Dawkins, *The Blind Watchmaker*, 77–86. Jerry Fodor and Massimo Piattelli-Palmarini argue in the first part of their book *What Darwin Got Wrong* (New York: Farrar, Straus & Giroux, 2010) that Darwinian evolutionary theory assigns much too much of the explanatory burden for the functional character of organisms to the external influence of natural selection, and not enough to the sources of genetic variation. This point is independent of their attack on the alleged intentionality of the idea of natural selection in the second part of the book—which seems to me, as to others, to be based on a misinterpretation.

There are also more mainstream figures who insist that the evidence calls for a more restricted account of the sources of variation in the genetic material. Marc W. Kirschner and John C. Gerhart, in *The Plausibility of Life: Resolving Darwin's Dilemma* (New Haven, CT: Yale University Press, 2005), suggest that genetic variation is biased to facilitate evolutionary change, though they do not imply that this calls for a revision of the larger reductionist conception of nature. Stuart Kauffman suggests in several books that variation is not due to chance, and that principles of spontaneous self-organization play a more important role than natural selection in evolutionary history. See *At Home in the Universe: The Search for Laws of Self-Organization and Complexity* (New York: Oxford University Press, 1995); *Investigations* (New York: Oxford University Press, 2000); *Reinventing the Sacred: A New View of Science, Reason, and Religion* (New York: Basic Books, 2008).

the option of natural selection as an explanation is not available. And the coming into existence of the genetic code—an arbitrary mapping of nucleotide sequences into amino acids, together with mechanisms that can read the code and carry out its instructions—seems particularly resistant to being revealed as probable given physical law alone.[5]

In thinking about these questions I have been stimulated by criticisms of the prevailing scientific world picture from a very different direction: the attack on Darwinism mounted in recent years from a religious perspective by the defenders of intelligent design. Even though writers like Michael Behe and Stephen Meyer are motivated at least in part by their religious beliefs, the empirical arguments they offer against the likelihood that the origin of life and its evolutionary history can be fully explained by physics and chemistry are of great interest in themselves.[6] Another skeptic, David Berlinski, has brought out these problems vividly without reference to the design inference.[7] Even if one is not drawn to the alternative of an explanation by the actions of a designer, the problems that these iconoclasts pose for the orthodox scientific consensus should be taken seriously.[8] They do not deserve the scorn with which they are commonly met. It is manifestly unfair.

5. Indeed there may be something deeply confused about the request for such an explanation—for a reason pointed out by Roger White, which I discuss in chapter 4.
6. See Michael J. Behe, *Darwin's Black Box: The Biochemical Challenge to Evolution* (New York: Simon & Schuster, 1996); Behe, *The Edge of Evolution: The Search for the Limits of Darwinism* (New York: Free Press, 2007); Stephen C. Meyer, *Signature in the Cell: DNA and the Evidence for Intelligent Design* (New York: HarperOne, 2009).
7. See David Berlinski, "On the Origins of Life," *Commentary*, February 2006, reprinted in Berlinski, *The Deniable Darwin, and Other Essays* (Seattle: Discovery Institute Press, 2009). See also Brian Goodwin, *How the Leopard Changed Its Spots: The Evolution of Complexity* (New York: Scribner's, 1994).
8. There are also criticisms of current theories from those who nevertheless expect a reductive solution; for example Robert Shapiro, *Origins: A Skeptic's Guide to the Creation of Life on Earth* (New York: Summit Books, 1986); Shapiro, "A Simpler Origin for Life," *Scientific American*, February 12, 2007. A very clear explanation of multiple aspects of current research into the origin of life and the possibility of extraterrestrial life is Steven Benner, *Life, the Universe and the Scientific Method* (Gainesville, FL: FfAME Press, 2008). Though

Those who have seriously criticized these arguments have certainly shown that there are ways to resist the design conclusion; but the general force of the negative part of the intelligent design position—skepticism about the likelihood of the orthodox reductive view, given the available evidence—does not appear to me to have been destroyed in these exchanges.[9] At least, the question should be regarded as open. To anyone interested in the basis of this judgment, I can only recommend a careful reading of some of the leading advocates on both sides of the issue—with special attention to what has been established by the critics of intelligent design. Whatever one may think about the possibility of a designer, the prevailing doctrine—that the appearance of life from dead matter and its evolution through accidental mutation and natural selection to its present forms has involved nothing but the operation of physical law—cannot be regarded as unassailable. It is an assumption governing the scientific project rather than a well-confirmed scientific hypothesis.

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he assumes this is a task for chemistry, he does say (287), "A real potential exists that current theory will *never* solve the problem at hand, keeping open the possibility for a true revolution in the related and surrounding sciences." Of course he doesn't mean intelligent design.

A problem with the most salient current research is that the synthesis of individual components of the genetic material is so heavily controlled and guided by the experimenters that it provides little evidence that the process could have occurred without intelligent guidance. And the crucial question of how these components could have combined into an information-rich coded sequence is left unaddressed.

9. The literature is extensive. See for example Kenneth R. Miller, *Finding Darwin's God: A Scientist's Search for Common Ground between God and Evolution* (New York: Cliff Street, 1999); Philip Kitcher, *Living with Darwin: Evolution, Design, and the Future of Faith* (New York: Oxford University Press, 2007); Elliott Sober, *Evidence and Evolution: The Logic Behind the Science* (Cambridge, UK: Cambridge University Press, 2008); for a sample of both sides of the debate, see Neil A. Manson, ed., *God and Design: The Teleological Argument and Modern Science* (New York: Routledge, 2003).

I confess to an ungrounded assumption of my own, in not finding it possible to regard the design alternative as a real option. I lack the *sensus divinitatis* that enables—indeed compels—so many people to see in the world the expression of divine purpose as naturally as they see in a smiling face the expression of human feeling.[10] So my speculations about an alternative to physics as a theory of everything do not invoke a transcendent being but tend toward complications to the immanent character of the natural order. That would also be a more unifying explanation than the design hypothesis. I disagree with the defenders of intelligent design in their assumption, one which they share with their opponents, that the only naturalistic alternative is a reductionist theory based on physical laws of the type with which we are familiar. Nevertheless, I believe the defenders of intelligent design deserve our gratitude for challenging a scientific world view that owes some of the passion displayed by its adherents precisely to the fact that it is thought to liberate us from religion.

That world view is ripe for displacement, in spite of the great achievements of reductive materialism, which will presumably continue for a long time to be our main source for concrete understanding and control of the world around us. To argue, as I will, that there is a lot it can't explain is not to offer an alternative. But the recognition of those limits is a precondition of looking for alternatives, or at least of being open to their possibility. And it may mean that some directions of pursuit of the materialist form of explanation will come to be seen as dead ends. If the appearance of conscious organisms in the world is due to principles of development that are not derived from the timeless laws of physics, that may be a reason for pessimism about purely chemical explanations of the origin of life as well.

10. I am not just unreceptive but strongly averse to the idea, as I have said elsewhere.

*Chapter 2*

# Antireductionism and the Natural Order

## 1

The conflict between scientific naturalism and various forms of antireductionism is a staple of recent philosophy. On one side there is the hope that everything can be accounted for at the most basic level by the physical sciences, extended to include biology.[1] On the other side there are doubts about whether the reality of such features of our world as consciousness, intentionality, meaning, purpose, thought, and value can be accommodated in a universe consisting at the most basic level only of physical facts—facts, however sophisticated, of the kind revealed by the physical sciences.

I will use the terms "materialism" or "materialist naturalism" to refer to one side of this conflict and "antireductionism" to refer to the other side, even though the terms are rather rough. The attempts to defend the materialist world picture as a potentially complete account of what there is take many forms, and not all of them involve reduction in the ordinary sense, such as the analysis of mental concepts in behavioral terms or the scientific identification of mental states with brain states. Many materialist naturalists would not describe their view

1. This program has been pursued with dedication in the writings of Daniel Dennett.

as reductionist. But to those who doubt the adequacy of such a world view, the different attempts to accommodate within it mind and related phenomena all appear as attempts to reduce the true extent of reality to a common basis that is not rich enough for the purpose. Hence the resistance can be brought together as antireductionism.

The tendency of these antireductionist doubts is usually negative. The conclusion they invite is that there are some things that the physical sciences alone cannot fully account for. Other forms of understanding may be needed, or perhaps there is more to reality than even the most fully developed physics can describe. If reduction fails in some respect, this reveals a limit to the reach of the physical sciences, which must therefore be supplemented by something else to account for the missing elements. But the situation may be more serious than that. If one doubts the reducibility of the mental to the physical, and likewise of all those other things that go with the mental, such as value and meaning, then there is some reason to doubt that a reductive materialism can apply even in biology, and therefore reason to doubt that materialism can give an adequate account even of the physical world. I want to explore the case for this breakdown, and to consider whether anything positive by way of a world view is imaginable in the wake of it.

We and other creatures with mental lives are organisms, and our mental capacities apparently depend on our physical constitution. So what explains the existence of organisms like us must also explain the existence of mind. But if the mental is not itself merely physical, it cannot be fully explained by physical science. And then, as I shall argue, it is difficult to avoid the conclusion that those aspects of our physical constitution that bring with them the mental cannot be fully explained by physical science either. If evolutionary biology is a physical theory—as it is generally taken to be—then it cannot account for the appearance of consciousness and of other

phenomena that are not physically reducible. So if mind is a product of biological evolution—if organisms with mental life are not miraculous anomalies but an integral part of nature—then biology cannot be a purely physical science. The possibility opens up of a pervasive conception of the natural order very different from materialism—one that makes mind central, rather than a side effect of physical law.

It seems clear that the conclusion of antireductionist arguments against materialism cannot remain purely negative forever. Even if the dominance of materialist naturalism is nearing its end, we need some idea of what might replace it. One of the things that drive the various reductionist programs about mind, value, and meaning, in spite of their inherent implausibility, is the lack of any comprehensive alternative. It can seem that the only way to accept the arguments against reduction is by adding peculiar extra ingredients like qualia, meanings, intentions, values, reasons, beliefs, and desires to the otherwise magnificently unified mathematical order of the physical universe. But this does not answer to the desire for a general understanding of how things fit together. A genuine alternative to the reductionist program would require an account of how mind and everything that goes with it is inherent in the universe.

I am just turning a familiar argument on its head in order to challenge the premises. Materialism requires reductionism; therefore the failure of reductionism requires an alternative to materialism. My aim is not so much to argue against reductionism as to investigate the consequences of rejecting it—to present the problem rather than to propose a solution. Materialist naturalism leads to reductionist ambitions because it seems unacceptable to deny the reality of all those familiar things that are not at first glance physical. But if no plausible reduction is available, and if denying reality to the mental continues to be unacceptable, that suggests that the original premise, materialist naturalism, is false, and not just around the edges. Perhaps the natural

order is not exclusively physical; or perhaps, in the worst case, there is no comprehensive natural order in which everything hangs together—only disconnected forms of understanding. But whatever may be the result, we must start out from a larger conception of what has to be understood in order to make sense of the natural world.

## 2

My guiding conviction is that mind is not just an afterthought or an accident or an add-on, but a basic aspect of nature. Quite apart from antireductionist arguments in the philosophy of mind, there is independent support for the step to such an enlarged conception of reality in one of the background conditions of science. Science is driven by the assumption that the world is intelligible. That is, the world in which we find ourselves, and about which experience gives us some information, can be not only described but understood. That assumption is behind every pursuit of knowledge, including pursuits that end in illusion. In the natural sciences as they have developed since the seventeenth century, the assumption of intelligibility has led to extraordinary discoveries, confirmed by prediction and experiment, of a hidden natural order that cannot be observed by human perception alone. Without the assumption of an intelligible underlying order, which long antedates the scientific revolution, those discoveries could not have been made.

What explains this order? One answer would be that nothing does: explanation comes to an end with the order itself, which the assumption of intelligibility has merely enabled us to uncover. Perhaps one level of order can be explained in terms of a still deeper level—as has happened repeatedly in the history of science. But in the end, on this view of the matter, understanding of the world will

eventually reach a point where there is nothing more to be said, except "This is just how things are."

I am not disposed to see the success of science in this way. It seems to me that one cannot really understand the scientific world view unless one assumes that the intelligibility of the world, as described by the laws that science has uncovered, is itself part of the deepest explanation of why things are as they are. So when we prefer one explanation of the same data to another because it is simpler and makes fewer arbitrary assumptions, that is not just an aesthetic preference: it is because we think the explanation that gives greater understanding is more likely to be true, just for that reason.

This assumption is a form of the principle of sufficient reason—that everything about the world can at some level be understood, and that if many things, even the most universal, initially seem arbitrary, that is because there are further things we do not know, which explain why they are not arbitrary after all.

The view that rational intelligibility is at the root of the natural order makes me, in a broad sense, an idealist—not a subjective idealist, since it doesn't amount to the claim that all reality is ultimately appearance—but an objective idealist in the tradition of Plato and perhaps also of certain post-Kantians, such as Schelling and Hegel, who are usually called absolute idealists. I suspect that there must be a strain of this kind of idealism in every theoretical scientist: pure empiricism is not enough.

The intelligibility of the world is no accident. Mind, in this view, is doubly related to the natural order. Nature is such as to give rise to conscious beings with minds; and it is such as to be comprehensible to such beings. Ultimately, therefore, such beings should be comprehensible to themselves. And these are fundamental features of the universe, not byproducts of contingent developments whose true explanation is given in terms that do not make reference to mind.