**How Is Neuroscience Possible?**

By neuroscience, I refer to the scientific study of the brain *qua* material thing, a structured set of interrelated tissues and structures constituting one of the major functioning organs of the human body.This study, a branch of medicine and natural science, consists of two main divisions. The first is *neuroanatomy*, which explores and studies the various kinds of tissues and structures existing in the brain: the cerebrum, the cerebellum, the brain stem, and so on, down to the microscopic level of individual brain cells (such as neurons) and the structures to which these cells belong. The second division, *neurophysiology*, is the study of the living brain and the electrochemical processes occurring there. In part, we are concerned with mapping these processes for their own sake. By and large, however, we study these processes with a special emphasis on their relation to mental events and processes, such as consciousness, sense perception, memory, imagination, and so on, which we believe we have good reason to think are in some way related to the living brain and the electrochemical processes occurring there. In pursuing this second project, neuroscience touches on questions that have traditionally been thought to fall in the province of philosophy, and has inspired philosophical research program under the banner of “cognitive science” or “neurophilosophy,” intended to “naturalize” the mental and incorporate it without remainder into a broadly physicalist worldview. Neuroscience, I think, inspires but does not require any such project in order to be viable as a science. However, many people, some of them neuroscientists themselves, have jumped on the “cognitive science” bandwagon, apparently convinced that anyone with even a passing acquaintance with the results of neuroscientific research must concede that consciousness and mind are wholly explicable in naturalistic, physical terms. Those like myself who resist what seems to many to be the obvious implication of modern science, are often dismissed as at best uninformed and at worst in the grips of a prescientific view of the world (sometimes called “folk psychology”) and thus little better than superstitious cranks.

Since neuroscience is an actual, going concern within that project of theoretical inquiry known as natural science, we must therefore conclude that it is possible. Those who take the positive results of neuroscientific research as a platform for the grand, speculative constructions spun out by the “cognitive scientists” take their stand on an apparently solid foundation. If, however, we raise the question that serves as the title to this essay, I think we will find that the general thrust of these grand, speculative constructions not only does not follow from the results of neuroscientific research but would, if true, make neuroscience (and indeed, all natural science) impossible. If the argument of this paper is correct, the philosophical materialist assumptions that inspire and undergird so-called “cognitive science” and “neurophilosophy” create severe epistemological and conceptual difficulties for the pursuit of theoretical inquiry in general, and for neuroscience in particular. The argument of this essay enforces the following conclusion: if the basic claims of “cognitive science” are true, then we can have no reason to believe the claims of neuroscience that inspire them in the philosophy of mind. Therefore, we must choose either neuroscience or “neurophilosophy” – we cannot have both. The very conditions necessary for the possibility of natural science as a going concern (hence of neuroscience as well) prove to be incompatible with the substantive truth of the presuppositions of “cognitive science.” It does not follow by itself that these substantive claims are false, but we will be hard pressed to make any sense out of theoretical inquiry of any kind, including natural science and philosophy, on the assumption that they are true. Therefore, since it turns out that we could never have any reason for supposing that these claims are actually true, even in principle, it is eminently rational for us to decline belief in these claims, even if they are true.

 I am sure that many will be inclined to dismiss the foregoing claims out of hand, and many more will be extremely resistant to accepting them, no matter what sort of argument is offered on their behalf. For one to read an essay with the “refute” button on is common enough among philosophers, especially when the reader has a strong, pre-philosophical commitment to a cherished view. As such, one might expect that I will be presenting some elaborate, convoluted argument for the conclusion I am trying to enforce. Not at all; my argument will be relatively brief and to the point, and is really the conjunction of three briefer arguments. Before presenting it, however, I need to make some banal points about the nature of theoretical inquiry as practiced by everyone who engages in it, philosopher and natural scientist alike.

**The Nature of Theoretical Inquiry** There is no space here for me to construct a complete philosophy of science. What follows here is simple a casual reflection on the process of theoretical inquiry as engaged in by researchers, regardless of their field of inquiry **–** a “folk psychology” of theoretical inquiry, if you will. I begin from the observation that theoretical inquirers generally adopt a realist stance with regard to their chosen form of inquiry, whatever it happens to be. We assume from the beginning that the object of inquiry is something existing and constituted independently of our thoughts, opinions, and even our awareness of them. At the same time, we assume that despite its objectivity, the object of inquiry is capable of being known by us, at least in principle. If either of these failed to be case, inquiry would be largely pointless. More than this, we take it for granted that the results of this inquiry are capable of being publically expressed and understood by anyone properly situated to receive it. The knowledge we seek through theoretical inquiry, then, is propositional knowledge, capable of being articulated in and through language.

 Theoretical inquiry, then, is a *goal-directed* process. It has an end or purpose, which is to acquire knowledge about reality for its own sake and express that knowledge in the form of propositional truths about it. This process also has a *norm*, i.e. reality itself, existing as such, taken to be touchstone for any claims made about it and to which our inquiry needs to be subordinated. Knowledge of the natural world, however, is of contingent states of affairs; as such, it cannot be acquired simply through *a priori*, armchair reflection. To the contrary, we can acquire this knowledge only through empirical investigation. In this process, our rational powers of observation, interpretation of data, memory, and rational inference, both deductive and inductive, must play a vital role in both the formation and the justification of our beliefs as expressed in language as substantive, true propositions about the world. It is likewise the case that theoretical inquiry must be *methodical* and guided by *discursive* reason if it is to have any hope of reaching the truth. Mere causal observation and unchecked speculation will not do.

 In natural science, for example, the process of inquiry takes the form of the *scientific method*. Beginning from some striking phenomenon that evokes wonder and curiosity, we proceed to observe carefully the phenomenon using the five senses, in order to acquire further data upon which to ground a possible explanation. The possible explanation, itself the product of imagination, is then formulated as an *hypothesis* capable of being tested in experience. Certain observable consequences are inferred from that hypothesis, and further observations, acquired either through direct sense-perception or through such perception mediated by artificial conditions of our own devising (such as a controlled experiment or a computer simulation), are sought. These consequences, if in fact observed, are said to confirm the hypothesis, and to disconfirm it if competent researchers fail to observe them. We take a sufficient number of repeated confirmations of the hypothesis to have justified it sufficiently to raise that hypothesis to the level of a theory and to incorporate it into the standing body of scientific knowledge. That standing body of well-confirmed results continues to grow through time and becomes a permanent human achievement capable of being passed down to subsequent generations, added to, and brought to ultimate completion. This account of the scientific method is no doubt over-simple and has been challenged by many contemporary philosophers and historians of science. Whether right or wrong, however, I take it that this is a correct, if superficial, description of what theoretical inquirers such as neuroscientists take themselves to be doing in the course of their research. To simplify this even more, I want to focus on just one aspect of this process: the role played by data and evidence in the formation of rational beliefs about the objects of theoretical inquiry.

 Within the context of theoretical inquiry, we suppose that the presence (or absence) of good reasons for belief, in the form of relevant observations, evidence, and sound arguments, both deductive and inductive, is highly relevant to the question of what we ought to believe about the nature of things. In general, or at least ideally, a rational belief is one that is occurrently held on the basis of good reasons (truth-connected grounds or sound argumentation) that one correctly recognizes to be such. A belief is dismissed as irrational if it is willfully held on inadequate grounds or arguments, held in abeyance of such grounds, or especially if it is held contrary to the weight of evidence or argument judged by competent inquirers to be relevant to that belief. The primary goal of theoretical inquiry is to provide these grounds and arguments in order that we may form our beliefs in accordance with them and thereby arrive at the best approximation to truth our circumstances will allow. These beliefs will be justified by those good reasons, recognized by us to be such, and consciously embraced by us on those grounds. Those reasons, then, just *as such*, will play a significant and, to the extent that we are rational, leading role in both the justification of those beliefs and the explanation of why we hold them and persist in holding them as well.

 For this reason-seeking and reason-giving activity to have any point, however, it has to be the case that these good reasons, whatever they are, are in fact capable of influencing our occurrent beliefs. In other words, it must be possible for reasons *as such* to affect our judgments and the beliefs we arrive at as the result of theoretical inquiry. Further, theoretical inquiry itself must be structured explicitly and consciously carried on in accordance with the canons of method and laws of logic supported by intellectual virtues such as love of truth, commitments to rationality and objectivity, and an attitude that is critical rather than rigidly dogmatic or carelessly skeptical. All of this implies that theoretical inquiry requires that the researcher have considerable rational autonomy, which includes both the capacity to be affected by evidence and argument, as well as the power to conform one’s beliefs to the evidence and the results acquired through properly applied method. The mind of the researcher must be penetrable by such reasons considered as such, and his or her belief-structure capable of reflecting that influence through conscious, willful adherence to propositions received as true precisely and ideally *solely* on the basis of reasons. Otherwise, theoretical inquiry will be nothing but a sham and an illusion.

 The same will hold of any special branch of theoretical inquiry, such as neuroscience. If neuroscience is to be possible as a going concern within natural science, then its object, the organic brain, must be capable of empirically investigation by researchers using the senses to observe the brain and identify its various component tissues and structures through anatomical observation. Further, the various processes going on in the living brain must be capable of being measured, monitored, and recorded in order that we may arrive at plausible hypotheses about the functions of the various structures and parts of the brain that compose that organ. These hypotheses need to be capable of confirmation or disconfirmation by various observational and experimental means, and the resulting data and interpretations capable of being reported to and repeated by others. In turn, all of this has to have some effect on what we believe, i.e. take to be the objective truth about the brain. Neuroscientists take it to be the case that, to the extent that we are rational, we will accept the outcome of their researches as true on the basis of their authority due to the fact that these results are justified by the evidence presented for them, regardless of our “druthers.” They thereby presuppose that it lies within our power to do so.

 However, if we accept the leading ideas informing “cognitive science” and “neurophilosophy” none of these claims can be true. The project of “naturalizing” consciousness and the mind has three main pillars: physicalism about the external world, materialism about mind, and neurophysiological determinism. Each of these, I contend, produces insuperable epistemological problems for neuroscience considered as a branch of theoretical inquiry, as it does for all science and philosophy. I will now proceed to say why I think this is the case.

**Physicalism and Knowledge of the Brain** By “physicalism,” I mean what I have elsewhere called *Galilean Physicalism*, i.e. physicalism about the external world.[[1]](#footnote-1) Galilean physicalism is an ontological claim about what really exists “outside the mind” and has been the common assumption of philosophers and scientists since Galileo first drew the primary/secondary quality distinction in the dedicatory letter prefaced to his treatise on comets, *Il Saggiatore*.[[2]](#footnote-2) According to this view, the only things that really, ultimately, or fundamentally exist are the entities and properties that are “quantified over” by physicists in the process of constructing mathematical models of the external world. The substantive picture, still affirmed by most of us today, is that nothing at all ultimately exists “out there” except matter swirling in the void and taking the form of various sorts of particles possessing a few simple properties and interacting in accordance with simple, non-purposive mechanical laws. Since the nineteenth century, forces have also been seen to be an irreducible part of the physical world, and the twentieth century has added space-time and “energy” to the mix. Everything “else” is merely a construction out of these particles, forces and so on, hence reducible to them. Few have been willing to deny that such things as tables, chairs, trees, the bodies of persons, etc. are non-existent or merely fictional, even though this would seem to be an obvious implication of commitment to physicalism.[[3]](#footnote-3) It is far more common for philosophers to assert both the truth of physicalism and yet affirm just as dogmatically that chairs, tables, and so on obviously exist.

 The classic problem here, of course, is that of Eddington’s two tables.[[4]](#footnote-4) First, there is the table as a material thing, perceived by the senses as a solid, singular, medium-sized material thing composed of wood and having a specific color, weight, and various proper parts. Second, there is the table *qua* physical object, which is simply a cloud of interacting atomic and subatomic particles externally related to one another by various forces. This physical object possesses none of the perceptible qualities we sense the table to possess – indeed, it is quite invisible – and consists largely of empty space. Rather than existing as a unit and being sharply delineated from other objects around it, it has only hazy boundaries and cannot be altogether distinguished from the things around it. There is simply one, uniform sort of matter differing in particle concentration throughout space-time. Despite the fact that the senses tell us that the first is the real table, if we take science seriously, the palm must go to the second. Although Eddington’s philosophically unsophisticated handling of some of these ideas exposed him to some well-deserved philosophical ridicule,[[5]](#footnote-5) it does not follow from this that his problem can simply be dismissed without further discussion.

 Indeed, if the foregoing is true, then certain serious epistemological problems seem to be unavoidable, at least within a scientific realist context. Ever since Galileo initiated the New Science, the appearance/reality distinction has loomed large in Western epistemology, along with all the skeptical worries to which this distinction gives rise. If the table *qua* physical object is the real (and the only real) table, then what is the status of the table as it appears to the senses? On the physicalist ontology, there appears to be no place for it in the external world, where invisible, imperceptible matter swirls, indifferent to our desire to know. It has been the common habit since Galileo and Descartes to evacuate the visible, perceptible table to the mind, where it exists as a subjective, mind-dependent mental image that at best represents without resembling the physical object that causes that image to appear in the mind. This merely apparent, mental table can be called the *phenomenal* table, whereas the table qua physical object can rightly be called the *noumenal* one. The difficulties for this view are too well-known to require extensive restating here. How does the phenomenal table represent the noumenal table in the first place? How do we even know that there is such a thing as the noumenal table? Even if there were, given that the table is noumenal and lies in principle beyond our sensible apprehension, how can we even conceive of such objects, let alone know, that the claims we are making about them are true? How then is natural science, even physics itself, possible for us as a mode of theoretical inquiry into the nature of reality? Despite much effort on the part of many clever thinkers, I doubt whether anyone has satisfactorily solved these problems or shown how they can be evaded without abandoning scientific realism. It is far more common for philosophers to simply dismiss these problems and assert dogmatically that if science says something, then it must be true and “there’s an end on it.”

 To show up this point more clearly, let’s apply the foregoing to neuroscience as described above. Both neuroanatomy and neurophysiology focus on the empirical investigation of the brain, which we apprehend by means of sense perception as a material thing, in particular, a bodily organ performing various functions within the overall economy of the body’s operation as a living thing. However, on the assumption that Galilean physicalism is true, the ontological status of the brain *qua* material thing is no less problematic than that of any other material thing. If we are to study the brain at all, then the brain must be apprehensible through the senses and so must be, in that sense, phenomenal or empirical – present to consciousness by means of the senses. However, being invisible and imperceptible, the noumenal brain (i.e. the brain *qua* physical object) cannot be present, *as such*, to consciousness by means of the senses. The phenomenal brain, then, cannot be (in any ontologically useful sense) the same thing as the physical brain apprehended by the senses and present to consciousness. We thus have two brains, a phenomenal and a noumenal one, corresponding to Eddington’s two tables.

 Neuroscientists take it for granted that the brain that they study, a bodily organ consisting of various tissues and structures accomplishing various kinds of tasks and functions within the overall economy of functioning in the body, is the real brain. Physicalism, however, tells us otherwise and leaves the status of the phenomenal brain accessible to scientific study in the air. If we follow the standard resolution of the two tables problem familiar from the tradition, the phenomenal brain is simply a collection of sense-data existing in the mind due to the causal influence of the noumenal brain on the mind. The phenomenal brain, then, is something that exists only in the mind as a mental image, or series of such images and thus is not an external object at all. If physicalism is true, then it appears that neuroscientists are simply mistaken if they think they are studying the real, physical brain when they investigate the phenomenal brain.

 It is natural at this point to expect an appeal to materialism about mind in aid of a solution to this difficulty. According to materialism, the mind *is* the brain, and more than this, *nothing but* the noumenal brain.[[6]](#footnote-6) Consciousness, then, is nothing but a purely physical process occurring in the noumenal (i.e. purely physical) brain. Our awareness of the phenomenal brain, then, is identical with some part of that purely physical process occurring in the noumenal brain, each component of which is identical with some physical brain-state. Therefore, since mind and brain are identical, awareness of the phenomenal brain, occurring in the consciousness, *must be* identical with awareness of the noumenal brain as well, so that awareness of the noumenal brain is itself part of a process occurring in the noumenal brain.

 However, identity in this sense cuts no epistemological ice. When Medea meets Orestes in disguise, she sees a man, and in seeing a man apprehends a man, and in apprehending a man is aware of a man. Since that man is her brother Orestes, there is a sense in which she is therefore aware of Orestes in being aware of the man who is identical to him. However, it does not follow from this she *knows* that she is apprehending Orestes or even *could* do so given her current apprehension. In the same way, if I am struck in the back of the head with a baseball bat, I am aware of being struck, and of being struck by something. Since the something that struck me in this case is a baseball bat, in being aware of being struck by something I am therefore also aware of the baseball bat with which I was struck. Even so, it does not follow that I know even so much as that I was struck by a baseball bat or even that I *could* know this based on my apprehension of the bat in the process of striking me. If I were to awaken from my concussion and spy a bloodied club next to my head, I would automatically assume that it was this and not the baseball bat that struck me. However, I may simply have been the victim of a serial clubber who always leaves the weapon used in his previous attack at the next one in order to taunt the police.

 Of course, if Medea had lifted the man’s hood or if a video surveillance camera contained footage of my attack, then additional information could have made this knowledge possible in principle for her and for me in these cases. However, the cases we have just been discussing are not parallel with that of the phenomenal and the noumenal brain. It is not possible for me to acquire any facts about the noumenal brain, including the (contingent) identity of the phenomenal with the noumenal brain, by some further empirical investigation, even if they are *in fact* identical. Our apprehension of the phenomenal brain by means of the senses is our only possible source of information about the noumenal brain and, as we have seen, even if in apprehending the phenomenal brain we in some sense apprehend the noumenal brain as well, we do not do so in such a way as to yield any knowledge about it. As such, Materialism neither addresses nor removes the difficulty about acquiring knowledge of the noumenal/physical brain from the apprehension of the phenomenal brain. Nor is this altogether surprising, since it is simply an application of the problem of the external world, itself the product of modern philosophy’s commitment to Galilean physicalism to a particular context, i.e. neuroscience.

**Materialism and Neuroscience** Materialism not only does not help the cause of neuroscience, it positively undermines that possibility by undermining the very possibility of theoretical inquiry as described above. Just as materialism asserts that the mind is nothing but the noumenal brain, it also contends that our perceptual experiences, thoughts, judgments, inferences, and beliefs are nothing but physical states of that brain, exhaustively describable in physical terms. More than this, their existence, order and succession is fully explicable in terms of the operation of purely physical causal antecedents governed only by the physical laws of motion. These causes, in turn, provide all of the necessary and sufficient for the occurrence of each of these physical events in precisely the order in which they occurred. This means that each of my thoughts occurred in precisely the order in which they occurred due solely to the operation of physical causes over which I have no control and to which my thought-processes made no causal contribution. As such, the actual contents of my mental processes, just as such, play no role whatsoever in explaining what I perceive, think, judge, infer, or believe. Indeed, if materialism about mind is true, mental contents, considered as such, possess no causal powers of their own; they are either mere epiphenomena or their causal powers are reducible to/ identical with/ nothing in addition to those exercised by the brain states with which they are identical.[[7]](#footnote-7)

 On this view, then, theoretical inquiry of the sort represented by philosophy and natural science, including neuroscience, is an *illusion*. The neuroscientist may believe that based on his perceptual observations he is acquiring data about the structure and functioning of the brain, that reflection on these observations leads him to make certain judgments about what those structures and functions are, and that assent to those judgments taking the form of beliefs are justified by good reasons and sound arguments. In fact, however, his or her phenomenological description of the process of theoretical inquiry as he or she actually experiences it turns out to be a mere exercise in “folk psychology.” However things may *seem* to him or her while engaged in actual neuroscientific research, the neuroscientific story about what happens when we do neuroscience is much different. According to that story, all that is *really* going on is that certain electrochemical events are occurring in the noumenal brain, events that we do not even so much as apprehend in any way that is useful for us for the acquisition of knowledge, let alone control or guide through any sort of reflective, intellectual process of discovery. To the contrary, if the materialist account of what goes on when we do neuroscience is correct, neither our observations, reflections, judgments, inferences or beliefs *as we experience them in consciousness* play *any* substantive role whatsoever, let alone an essential one, in determining either the course or the outcome of neuroscientific research. They are preempted from making any such contribution by the fact that causation on the purely physical level occurring in the noumenal brain has already determined these matters down to the last detail. As such, if my theoretical inquiry has succeeded in reaching the substantive truth about the brain this is something that from the point of view of its physical causes – and that is the only point of view that counts if materialism is true – can only be regarded as fortuitous and accidental.

 One might think that this need not make any real difference to theoretical inquiry, regarded as the search for truth. After all, the possibility that this purely physical process might instantiate or realize a truth-tracking instance of theoretical inquiry cannot be ruled out in advance. Further, does it not lie within our power to *review* our results and thereby convince ourselves that our observations are in fact correct, our judgments sound, and our beliefs about the brain based on experiment and argument sufficient to justify those results? The answer to this, unfortunately, is “No!” if materialism is true. Our attempts to review our results by reexamining the data, the experimental outcomes and the arguments upon which our beliefs are based must, if materialism is true, themselves be at best the epiphenomena of some process going on in our brain, the occurrence of which is the consequence of purely physical causes over which we had no control. In turn, each of the components of this process will be a physical brain-state wholly determined by the operation of purely physical causes operating in accordance with the truth-indifferent laws of motion. As such, it is no more intrinsically truth-connected than any other brain process, and so it can offer us only cold comfort that our efforts at review seem to confirm our original results. As such, the mere logical possibility that such a process could accidentally instantiate an instance of theoretical inquiry, let alone successful theoretical inquiry, through some chance process does not give us any reason to suppose that something like this would ever actually happen. To suppose that it could happen over and over again seems incomprehensibly unlikely.

**Neurophysiological Determinism and Neuroscience** A final, fatal difficulty for the materialist’s attempt to “naturalize” neuroscientific research resides in the thesis I call neurophysiological determinism.[[8]](#footnote-8) If materialism about mind is true, then all of our mental processes and their products are fully and completely explicable of the operation of purely physical causes operating in the brain of which we have no epistemically significant apprehension. These causes, in turn, fully determine the course of the neuroscientist’s theoretical inquiry, from beginning to end, prior to him or her even beginning to undertake the research constitutive of that inquiry. If that is so, then the neuroscientist has no effective control over the course of his or her research – that has already been determined by forces outside of his or her control. All of one’s observations, thoughts, judgments, inferences, and beliefs are already in the cards before the scientist even begins to collect the data. Although it may appear to the neuroscientist that he or she is being open, objective, and sensitive to data, experimental results, and the logical force of reason and argument, once again this is only the way it *seems* to him or her from the first person point of view. From the objective, third-person point of view, this facile self-awareness is superseded by a genuinely scientific account according to which theoretical inquiry is no genuine activity at all, let alone an intellectual pursuit of truth, on the part of scientists. Instead, it is simply something that *happens* to them, something individual scientists undergo as the result of the operation of causes over which they have no control and are powerless to evade, alter, or correct.

 More than this, we find further reinforcement for a point we made in the last section. Neuroscientists suppose that their beliefs are based on observation, reflective thought, judgment, empirical evidence, and argument. They furthermore suppose that it is precisely the epistemically significant aspects of observation, judgment, empirical evidence and argument that exercise the greatest influence in forming their substantive beliefs about the brain. Indeed, if this is not so, then it would seem that theoretical inquiry in general and neuroscience in particular would have no guarantee of being truth-connected, no matter how thoughtfully and carefully its researches were undertaken. Yet, as we have seen, if materialism about mind is true then we have no reason at all to believe this. The operation of purely physical causes in the noumenal brain leave no room for observation, reflective thought, judgment, reasoning, deliberation, discussion and so on to rationally influence our substantive beliefs. The epistemically significant aspects of our mental states are thereby excluded from playing any role at all, let alone the leading role, in theoretical inquiry. These can have influence only to the extent that they are caused to have it in virtue of the causal powers residing the non-rational, purely physical states of the noumenal brain with which they are identical operating in accordance with the laws of motion. Despite appearances, then, no one has ever held a belief based on observation, judgment, empirical evidence, or rational argument, except insofar as they were caused to do so by brain processes that they neither control nor direct and which reach predestined results causally determined from the beginning of time. In that case, neuroscience is itself impossible as an exercise in theoretical inquiry as traditionally understood.

**Why Externalism won’t Help** The proponent of materialism may well wish to question a hitherto unstated presupposition of the foregoing arguments. According to the standard account of the theoretical inquiry as I have presented it, it is not enough that I actually possess adequate grounds for my beliefs; it is further required that those grounds be accessible to me and be the actual grounds for my belief. This is a version of the epistemic theory known as *internalism*, one that requires access to the justificatory grounds for one’s beliefs as a condition for the rationality of one’s beliefs. Perhaps, however, one could craft an externalist account of rationality, according to which it is not necessary that one be able to access the rational grounds for one’s beliefs in order for those beliefs to be rational. Rather, it will be *sufficient* for a belief’s being rational that it be produced by a causal process (consisting wholly, e.g., of purely physical brain states) that (physically) realizes or instantiates a line of reasoning that, if it *were* available to the subject thinking it, *would* justify that believer’s belief. This sort of thing is much more amenable to the materialist point of view than the standard view outlined above, which no doubt accounts for some of its current popularity. However, it is not without its difficulties.

 Externalism is most plausible in those cases in which the focus is what some philosophers have called *basic beliefs*, i.e. judgments arising spontaneously from direct experience, and which are thus based on non-propositional grounds.[[9]](#footnote-9) Externalism is much less plausible where our focus is theoretical inquiry as the search for substantive truths about the nature of things. After all, theoretical knowledge appears to be explicitly based on and thus a product of, conscious discursive reasoning rather than any merely mechanical causal process. However, some philosophers have suggested that perhaps a generalized version of externalism could be enlisted to secure the reliability or proper functioning of our cognitive faculties, such that rational beliefs are those produced by cognitive processes causally hooked up to the world in such a way as to track truth. Even in the simple case, however, this is problematic.

 Suppose I am “appeared to treely” at the current moment and wonder whether I am actually seeing a tree. The externalist can apparently do no more than tell me that, if my “being appeared to treely” has been caused by a reliable (i.e. truth-tracking) cognitive faculty of perception, then it is rational for me to be believe that I am seeing a tree and if not, then I am not rational in so believing. This is not very helpful; in a certain sense I already knew this, so to have it reiterated is not responsive to the question asked. Again, imagine Seyton telling Macbeth, “My Lord, if the dagger thou seest before ye be caused by a reliable, truth-tracking cognitive faculty, then certes, there be a dagger before ye, yet if not, then it be none but an hallucination.” What should Macbeth decide about his dagger? Perhaps Macbeth and I can investigate the question of whether we possess reliable cognitive faculties. However, not only is this against the spirit of the externalist enterprise, since it is once again the search for internal justification for my belief about the reliability of my cognitive faculties, it appears that it couldn’t possibly succeed. We have no cognitive faculties to use other than those we already possess in order to resolve the question, yet it is precisely these faculties that are being called into question in asking it. As such, no progress will have been made regardless of what conclusion we arrive at. If my cognitive faculties certify themselves, then my reasoning will have been circular and so useless. If my cognitive faculties undermine themselves, then we can have no confidence that they have reached a sound result in this case either. In either case, the question remains unanswered and indeed, appears to be unanswerable from the externalist point of view.

 In the next place, let us ask the externalist why we should think that externalism is true. I suppose that a consistent externalist would have to decline to answer that question and respond that if a reliable, truth-tracking cognitive faculty has produced one’s belief in externalism, then it is rational to believe externalism, and if not, not.[[10]](#footnote-10) But of course this is not how externalists respond to this question. Quite the contrary, externalists are well prepared to argue for their view using philosophical arguments intended to persuade us of the truth of their conclusions on the basis of the evidence provided by the premises. Most commonly, they argue for externalism *indirectly* by presenting arguments against internalism: we are told, for example, that internalists cannot evade problem of the criterion. However, this is still to argue as an internalist would argue, a strategy that cannot succeed, since the success of any such argument would epistemically undermine itself and leave us with no way to either affirm or deny its conclusion. More than this, for such a strategy to succeed, it would have to be case that it was possible for me to affirm the conclusion on the basis of the premises in the first place, something which we have surely seen by now is not possible if materialism is true. So, externalism has not helped us to evade that difficulty after all.

 We must conclude, then, that there can be neither externalist nor internalist grounds for affirming the truth of externalism. Even if there were, they could not help the cause of materialism. Externalism appears to be the sort of view that can only be attractive to someone like Aristotle (arguably the first externalist) who already believes that he possesses all substantive truth and is therefore inclined to regard any skeptical doubts as frivolous.[[11]](#footnote-11) Given the foregoing, however, one may well question whether this attitude is warranted for us.

**Why Evolutionism won’t Help** One might be tempted to supplement the externalist account with an appeal to evolution. Ever since Quine’s famous article, evolutionary epistemologists have attempted to argue that we could explain knowledge as the product of some sort of evolutionary process occurring in natural history.[[12]](#footnote-12) The feeling seems to be that all knowledge is potentially valuable for survival and cognitive error likely to involve fatal maladaption. Each organism, it is said, is a kind of “theory” about the way the world is, a theory to be either confirmed or refuted by how well adapted it is to its environment. As such, there would be selective pressure in favor of this sort of adaption, and thus a reproductive advantage, expressed as differential reproduction, to those organisms whose “theories” are greater in their conformity to reality, and thus to the truth about things.

 Given the prior commitment to externalism, such an appeal will simply be to the *possibility* of such an account as a potential explanation for the existence of truth-tracking cognitive faculties. We cannot, in this context, argue that such an account is substantively true, since to argue for it on the basis of scientific evidence would not only be to abandon externalism for internalism but also to beg the question, since we can only judge the evidence for evolution using the very cognitive faculties that have been called into question. I can only know that evolution is true if my cognitive faculties are sound, so I cannot argue that this is the case by appeal to the truth of an evolutionary account of their development. To do so would be to commit the Darwinian equivalent of the Cartesian circle. Even so, it may be urged that such an evolutionary account could *explain* how truth-tracking cognitive faculties are possible and thus, how externalism could be true.

 It might, if in fact there were any reason to believe that this proposal were at all likely. However, as some notable philosophers have pointed out, there is no realistic prospect for the suggestion that evolution would have endowed us with reliable, truth-tracking cognitive faculties. Evolution, so we are told, is driven solely by chance and necessity, and “rewards” only behavior that aids an organism’s survival and differential reproduction. Evolution operates, not by endowing organisms with cognitive powers or states, but instead by forging adaptive links between behaviors and survival/differential reproduction.[[13]](#footnote-13) As such, we can expect evolution to lead organisms to true “beliefs” only in those areas (such as basic sense perception) and those subjects (e.g., food, predators, and potential mates) that directly bear on survival and differential reproduction. Even in those cases, that an organism arrives at a true belief (or something like it) is purely fortuitous and accidental, having nothing to do with the fact that what is “believed” is true *as such*. Truth-tracking as such, then, cannot be an evolutionary “goal” for any organism and thus we cannot plausibly explain how reliable, truth-tracking faculties might have come about. For this reason, the standard evolutionary account of these matters, going back to Darwin’s time, suggests that our cognitive faculties originally developed for some other function related to survival and differential reproduction, which having been overcome their initial challenge, left these faculties idling and capable of being employed for other tasks. On that account, however, we have no reason to believe that these faculties are the least bit adequate to the task of tracking truth. It is thus hard to avoid agreeing with Plantinga’s judgment that the likelihood that we have such faculties, given naturalistic evolutionism is “low to inscrutable.”[[14]](#footnote-14)

 More than this, given our concern here is with theoretical knowledge for its own sake and with the faculties that might have made this possible, we need to note that beliefs of this sort have very little direct impact either on survival or differential reproduction. There have been many religions, cosmologies, political ideologies, and scientific paradigms commanding the assent of human beings throughout our history. In all but very few cases, these allegiances make no significant impact on differential reproduction, not even belief in evolution itself. While it is true that modern science has contributed greatly to both human survival and human flourishing through the application of theoretical knowledge to the problems of life, the notion that evolution may have somehow provisioned us with reliable, truth-tracking cognitive faculties in order to make this remote end possible for us seems teleological in the extreme. However, as the proponents of evolutionism never tire of telling us, evolution is a “blind” process, incapable of any remote provisioning. This in turn suggests that the odds against any such faculties surviving long enough in a population to emerge as useful in this way is highly improbable.

 It is sometimes argued that the fact that we can build bridges that don’t collapse and so on is proof that we have reliable, truth-tracking cognitive faculties. The suggestion is that, since our cognitive faculties must have evolved, that despite the long odds, evolution must have somehow accidentally produced them. To the contrary, on the standard, adaptive-link account of how evolution operates, it remains highly unlikely that evolution could have given rise to reliable, truth-tracking cognitive faculties. Any evidence that we do, in fact, possess such faculties supports, not the evolutionary “long shot” view but rather presents an obvious anomaly for the usual, adaptive link account of evolution, at least in this context. In that case, the very fact that we can formulate the theory of evolution and confirm it as a fact of natural history is evidence against the usual, adaptive-link account of evolution as applied to cognition. Externalism, then, borrows little support from such an implausible view.

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How, then, *is* neuroscience possible? That is a topic for another paper; this one is already too long.[[15]](#footnote-15)

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1. See Duncan (2008), 4-8. [↑](#footnote-ref-1)
2. See Matthews (1989), 56-61. [↑](#footnote-ref-2)
3. See, for example, Peter Van Inwagen (1990), and Merricks (2003), both of whom deny the existence of composite material things. Ladyman et al (2007) go even farther and deny the existence of simple material substances in favor of a “structural realism” that dispenses with substances altogether and that they claim is the only ontology compatible with the latest physics. [↑](#footnote-ref-3)
4. See Eddington (1929), ix-xvii. [↑](#footnote-ref-4)
5. See L. Susan Stebbing (1940) 45-61 for a hilarious discussion of Eddington’s ideas, many of which are on the mark. [↑](#footnote-ref-5)
6. As Jerome Shaffer pointed out many years ago, mere identity in this context is not enough to constitute the materialist position; an idealist also claims that the mind and the brain are identical, differing from the materialist in asserting that the brain is nothing but a sequence of sense-impressions occurring in the immaterial mind. [↑](#footnote-ref-6)
7. This appears to be the view of Jaegwon Kim; see his (2005, *passim*). Although he reluctantly admits both the existence and the irreducibility of *qualia* to physical states of the brain, he continues to argue that there is no such thing as mental causation *per se*; all mental causation is ultimately and exhaustively reducible to physical causation occurring in the brain. [↑](#footnote-ref-7)
8. This is a retread of the argument of my paper “The Consequences of Neurophysiological Determinism” applied to the present context, and those familiar with that paper, also posted to *PhilPapers*, can skip this section without loss. [↑](#footnote-ref-8)
9. Plantinga (2004) 175-7; so far as I know, Plantinga does not distinguish “basic” from “properly basic” beliefs. [↑](#footnote-ref-9)
10. I remember hearing Daniel Dennett many years ago, who reported that, in a debate with a behaviorist, he had gotten his opponent (I think his first name was Ed) to admit that all of our beliefs were the result of positive reinforcement, *including that one*. Dennett saw this as sufficient to dismiss his opponent’s view as absurd; however, I believe that a parallel argument applies equally well to his own position, and to any position like it as well. [↑](#footnote-ref-10)
11. As opposed to Plato, who gives the classic internalist definition of knowledge as justified true belief, Aristotle defines knowledge as the conformity of the intellect to its object, something that he thinks is automatically produced by the causal influence of external material things on the senses. [↑](#footnote-ref-11)
12. “Epistemology Naturalized” (1969); reprinted in Kornblith (1985), 15-29. [↑](#footnote-ref-12)
13. Sharon Street explains this nicely in her (2006), [↑](#footnote-ref-13)
14. See Plantinga (1994) 216-37. [↑](#footnote-ref-14)
15. See my “Dualism and Neuroscience,” forthcoming. [↑](#footnote-ref-15)