**Causal Necessity and the Future: Two Views**

 The French astronomer Laplace, a well-known proponent of mechanistic determinism, once proposed that if a perfect calculator (sometimes referred to as “Laplace’s Demon,” though I will not use this expression) were to know the position, velocity, and direction of every atom in the universe at any particular time, he would be able to use Newton’s laws of motion to postdict every previous state of the universe and predict every future state of the universe. In this paper I want to examine this claim and suggest that there at least two ways in which this claim can be interpreted. Further, I will argue that the most common of these two ways is, in fact, very likely false and incapable of any sort of empirical justification. Although widely accepted within the philosophical and scientific community, this first way of interpreting causal necessity, the fatalistic necessity associated with the mechanistic view of nature, it is not the only possible account of the nature of efficient causation available to us.[[1]](#footnote-1) There is at least one alternative to it, which I call the *Conditional Necessity* view, which I will contrast with the mechanistic/fatalist account and argue to be preferable to it.

 **Two Conceptions of Causal Necessity**

 For the most part, philosophers and scientists who endorse causal realism suppose that physical causes are always efficacious, such that to say that A is the physical cause of B, if true, ensures or guarantees that B will occur *come what may*. On this view, A, the physical cause of B, is supposed to be both necessary and sufficient for B’s existing, occurring, or obtaining, such that if A exists, occurs, or obtains, then so *must* B. To put it another way, B cannot fail to exist, occur, or obtain if A does. Thus, from our knowledge that A exists, occurs, or obtains, we can confidently infer that B does as well, or will do so in the course of time. On this view, then, if A *really* is the (or a) cause of B, it cannot be the case that A exists, occurs, or obtains and B does not. Causal necessity has to be understood as unconditional and absolute, not just in theory, but in fact. On this view then, the future is closed, not only with respect to B, but to all other future effects as well. The illusion that it is not is simply the result of our ignorance of the causes that have already determined what the future will be. Everything is set in stone. It is written. *Che sera, sera* - and that’s not a tautology. We can call this sort of necessity *fatalistic* necessity, since it entails (or at any rate, people like Laplace seem to think) that, given the physically necessary and sufficient conditions for B exist, occur, or obtain, the occurrence of B is inevitable and incapable of being altered or prevented.

 However, on the suggestion I will now make causal necessity is a form of *conditional* rather than fatalistic necessity. Suppose that A and B are connected in such a way that A is causally sufficient for the occurrence of B. On the view to be sketched here, the existence, occurrence, or obtaining of A, even though in a straightforward sense casually sufficient for the existence, occurrence, or obtaining of B, does *not* by itself ensure or guarantee the actual occurrence of B, though it does retroactively *explain from the physical point of view* the existence, occurrence, or obtaining of B should it be subsequently observed. To put it another way, while A possesses everything *physically* necessary and sufficient for the actual production of B, this by itself does not ensure that B will actually exist, occur, or obtain. The reason for this, on this view, is that all efficient causal sequences are *in principle interruptible*, even if not so in fact, and thus can conceivably fail to give rise to the outcome or effect for which that sequence of causes provided the physically necessary and sufficient conditions. Thus, even when all the physically necessary and sufficient conditions for B are in place, B may still fail to exist, occur, or obtain. Instead, those physically necessary and sufficient conditions for B can be counted on to produce B *only on the condition that* nothing intervenes to prevent those conditions from producing B. On this view, as opposed to the first, the future is *open*, not closed, with regard to B and so with regard to all future events *projectable* from the present state of the world on the basis of the efficient causal processes operating at that time as understood from the physical point of view. None of these projectable future events is inevitable in principle, though many cannot be prevented in fact due to limitations of our knowledge, our power, or our lack of presence to the relevant circumstances at the right time, and so on.

 The view that I have just been describing will strike most philosophers as a total non-starter. In fact, I am hard-pressed to point to a single philosopher, ancient or modern, who unambiguously endorses it just as I have described it, although Aristotle can perhaps be read as endorsing something like the view I am about to sketch.[[2]](#footnote-2) Nevertheless, I think it is fairly easy to motivate both from common experience and from science. For example, we now know that, from the moment of conception, a fertilized ovum has encoded in its DNA all of the physically necessary and sufficient conditions for full existence as a human being. Indeed, it is already engaged in the process by means of which the fertilized ovum will naturally develop into a full-fledged human baby. However, although the physically necessary and sufficient conditions for this outcome are already fully present in that fertilized ovum, it does not follow that the baby will subsequently be born. An abortion can stop that process in the space of a single heartbeat. Nevertheless, despite the fact that the abortion permanently and irrevocably forecloses that projectable outcome, we nevertheless feel quite confident, both on grounds of common experience and scientific embryology, that the following counterfactual is true: if the abortion had not occurred, that process of fetal development would have continued with the high probability that the outcome would have been the birth of a living, human baby. Our confidence in the truth of this counterfactual is not diminished by the fact that pregnancy does not always have this outcome - many interfering conditions can prevent this outcome from being realized. Yet when we observe that outcome, we do not regard it to be merely fortuitous or inexplicable; nor do we feel the need to appeal to anything beyond the immanent process of fetal development in order to account for this outcome. It is, as we say, the result of a natural process that both intends and generally results in the outcome we have observed and for which medical science has specified the mechanism in a detailed way. For this reason, we suppose that what we observe in most cases is what we would observe in all cases if nothing interfered with that process in such a way as to prevent the realization of that outcome. Indeed, I believe that we would still recognize this to be the case even if, for some reason, an increasingly large number of such interfering factors were to appear so that this process would rarely, if ever, achieve, realize, or result in its intended/recognized natural outcome.

 This, of course, is just one example. We can imagine many more at will; indeed, nearly any efficient causal process as we actually encounter it in experience will fit this model. From consideration of these examples, a more general conception of nature emerges, one in which we conceive of the world as consisting of numerous, independent efficient causal sequences that potentially overlap and interfere with each other. At these nodes of intersection or overlap, these causal chains can interfere with one another, either enhancing or interrupting their operation, even to the point of terminating them before they have achieved their intended, natural outcomes. On this view, all natural efficient causal processes are in principle interruptible and many are interrupted in fact. Events that occur at these nodes of intersection or overlap can be called “chance” events in the Aristotelian sense, since they were not projectible from any of the overlapping causal chains that result in their existence, occurrence, or obtaining considered in themselves.[[3]](#footnote-3) However, such events would presumably be predictable from the perspective of Laplace’s perfect calculator, who comprehends all of these chains at once in a single perspective.

 However, lest we wander, let me focus on the salient difference between the standard of view of causal necessity and the view under consideration here. On the view under consideration here, all of the physically necessary and sufficient conditions for the existence, occurrence, or obtaining of B can be actual without it being the case that B actually does subsequently exist, occur, or obtain. That is because it is possible that there may exist some other, independent causal chain capable of interfering with the operation of that chain that naturally results in the existence, occurrence, or obtaining of B in such a way as to prevent that outcome, so that B does not exist, occur, or obtain after all. The traditional mechanist view, however, will have none of this and insists instead that every state of every thing, every event and every state-of-affairs is part of one, single, comprehensive network of efficient causes that dictates every such element of reality be exactly what it is and not otherwise. The following example will help make the difference between these two views clearer.

I am playing pool with David Hume. Hume has just run the table, taken aim at the cue ball and hit it toward the eight ball with the easily predictable outcome that he will put the eight ball in the corner pocket, thereby winning the game. In a fit of pique, I use my cue stick to intercept the cue ball Hume just struck, sending it bouncing onto the floor and thus preventing it from hitting and sinking the eight ball. Of course, I lose anyway, since to interfere in this way is against the rules and constitutes an automatic forfeiture of the game. More than this, Hume has the satisfaction of knowing that, had I not deflected the cue ball, he would have sunk the eight ball anyway, and so would have won the game fair and square. He has no doubt about the truth of this counterfactual and, since he doesn’t win very often and loves to gloat, he can be counted on to insist on it. The physically necessary and sufficient conditions for that event to occur were present and that natural outcome would have as well if I had not acted to intervene in that process. But for my interference, he would have sunk the eight ball; that’s a fact, despite it’s also being a fact that he did not actually manage to accomplish this feat. The process was interruptible and, in this case, interrupted.

By the same token, the action by means of which I interrupted that process was also interruptible, even though it was not in fact interrupted. For example, suppose that Immanuel Kant has his quarter on the table and is preparing to play the winner of the great Hume/Duncan showdown on the pool table. Knowing that I am an ill-tempered, irascible man, Kant anticipates that I might try to spoil Hume’s victory, so that when I try to deflect the cue-ball he nudges my elbow so I miss and Hume sinks the eight ball after all. If Kant had acted in that way, then he would have interrupted the causal process that I was attempting to initiate with the result that the causal sequence initiated by Hume was not interrupted and thus produced its intended result. In turn, Kant’s attempt to deflect my aim could have been prevented if Kant had just had a stroke, so that when he attempted to move his arm to intersect my elbow, he would have found that his arm was paralyzed, and so on… In every case, we can envisage some further circumstance that, had it been actual, would have obtruded to prevent some thing, event, or state-of-affairs from existing, occurring, or obtaining despite the fact that all of the physically necessary and sufficient conditions for its existence, occurrence, or obtaining were already present and operating to bring it about.

The proponent of mechanism, however, rejects this picture of things. According to the mechanist, of the various scenarios I have outlined in this case *only one* of them was ever causally possible given the previous states of the world.[[4]](#footnote-4) Although a number of projectible futures appear to be exponible from the situation that obtains at the time Hume makes his shot, this is merely an illusion resulting from our ignorance of the true physical state of the world. In fact, says the mechanist, the operation of previous efficient causes has wholly excluded any futures other than the one that we subsequently observe, so that if those causes determined that I would act to deflect Hume’s shot, then it was never causally possible for Hume to have sunk the eight ball, for Kant to have interfered, or for Kant to have been prevented from interfering with my action as a consequence of a sudden stroke. In the same way, if any of these other alternatives had been foreordained by the previous states of the world, then they too would have been completely unavoidable. For the mechanist, the causally possible is coincident with the causally necessary and any other projectible future is only apparently so and ultimately merely imaginary.[[5]](#footnote-5) Although we may talk about what would have been the case in counterfactual conditions and projectible alternate futures that is only a *facon de parler*. There is only one efficient causal process taking place in the world, and it is responsible for all actuality, comprehending everything that exists, occurs, or obtains and it is in no way merely conditionally necessary. That efficient causal process cannot be interrupted or any of its elements avoided, evaded, or prevented. On the contrary, since the causally possible coincides with the causally necessary, no thing, event, or state-of-affairs for which the physically necessary and sufficient conditions have been actualized or realized in nature can possibly fail to exist, occur, or obtain. Therefore, any putatively projectible future that that does not come to pass is one for which, however it may presently appear to us, the necessary and sufficient conditions for its occurrence are not and never will be actual. From the retrospective point of view provided by the present on the past, it becomes evident that the causal forces in play at that time preselected a single causally possible future from that moment forward into the present; the same will hold true of all future states of the world relative to the present moment just as it does for every moment prior to the present one.

So, on the first view, we have numerous, independent causal chains and processes occurring in the world, each of which is interruptible in principle and often overlap and interfere with one another. On the other, there is really only one, complex series of efficient causes occurring in nature, determining everything that happens and incapable even in principle of being altered, changed, deflected, or interfered with in any way. The first view seems the natural interpretation of both our common experience and scientific practice, one for which there is seemingly insurmountable empirical evidence. Indeed, it seems as though if the mechanist view were correct, the more that we know about natural processes, the less power we would have over nature or the course of the future. In fact, however, the success of science has greatly enhanced not just our knowledge, but also our control over nature and our ability to alter the projectible future. The second, however, is the dominant ideology of the scientific revolution from the time of Galileo and Descartes, often seen either to be a presupposition or methodological commitment of modern natural science, and other times seen as its obvious empirical consequence.

However, it is not at all obvious that this must be the case. Certainly, it follows trivially that if B is observed that all of the physically necessary and sufficient conditions for B’s existence, occurrence, or obtaining must have been actually present. In that sense, the mechanist point of view is innocuous. However, it does not follow from this that they must have been present in such a way that the existence, occurrence, or obtaining of B was somehow inevitable from the time that those conditions were actually present and operating. Given that B is now actual, we can successfully infer that no such interfering condition acted to prevent its existence, occurrence, or obtaining. However, that does not entail, or even support, the idea that no such interfering conditions *could have* operated to prevent B from becoming actual. In principle, there is no reason *a priori* to suppose that nothing could have occurred to prevent B despite that fact. Neither is there any empirical evidence to exclude this possibility given the circumstances. To this extent, mechanism seems to exceed what the actual evidence will support.

Nor is there any reason to think that natural science would be in any way hampered in its legitimate aim of understanding the nature of the physical world by adopting the conditional necessity view and eschewing mechanism. So far as I can see, these two different ways of interpreting efficient causal processes are descriptively equivalent so far as the events themselves are concerned. Each is compatible with the existence of laws of nature, although the view I am envisaging grounds those laws in the natures of things rather than treating them as principles that somehow mysteriously govern and explain natural processes in their own right. Laws of nature are not universal, exceptionless descriptive principles that invariably predict the actual future from the current state of things. Such laws come with built in *ceteris paribus* clauses, so that they are more than mere regularities grounded in habit and custom and thus cannot be refuted simply because we do not always observe B after we observe A. Such a law will be refuted only when no interfering cause can be found to account for the fact that B did not follow A. In the case of well-confirmed laws of nature, our expectation will be that in such cases we will be able to identify an interfering cause that accounts for the failure of such a law in each case where this failure is observed. Thus, on this view, a law of nature can fail to be a perfect predictor of future events without failing to count as a genuine law. However, this view requires that we root those laws in something other than mere observed regularities and treat them as something more than merely abstract, mathematical schemata embedded in a predictive theory. However, I will have to consider this topic elsewhere.[[6]](#footnote-6) For the nonce, let us return to Laplace’s perfect calculator and consider the implication of these two views for Laplace’s famous claim, beginning with mechanism.

 **Mechanism and Experience**

I have just finished sketching an alternative to mechanism as a philosophy of nature, one that I think is both coincident with common experience and adequate for the purposes of natural science. I have also suggested that mechanism is neither necessary nor sufficient for there to be, e.g., law-governed natural processes occurring in the world. Mechanism now has a rival in this area and the question becomes that of choosing between these views. With this in mind we ask ourselves the following: is the world as we would expect it to be if mechanism were true? This, in turn, raises the prior question: What would we expect the world to be like if mechanism were true?

In a paper written many years ago, Alvin Goldman sketches a scenario in which we would have strong empirical evidence that mechanism was true.[[7]](#footnote-7) He imagines discovering a book with his own name on it in the university library, one that contains a timeline and entries for all the events of his life. Despite assiduous attempts to falsify the entries in the book, Goldman is never able to alter or refute a single statement recorded there, ultimately acceding to his own death by suicide as predicted by his “book of life.” Despite full knowledge of the book and its contents, Goldman finds himself powerless to do anything capable of making any difference at all to projected future events. Like Omar Khayyam, he must conclude that

The Moving Finger writes; and, having writ,

Moves on: nor all thy Piety nor Wit

Shall lure it back to cancel half a Line

Nor all thy Tears wash out a Word of it.

A sobering vision indeed!

 Fortunately, that is not the world in which we live, at least to judge by appearances. For one thing, as Sir Karl Popper argued many years ago, there are a substantial number of events that are not predictable *in principle,* since such predictions would be self-refuting.[[8]](#footnote-8) Indeed, any novel event (such as a scientific discovery, a sentence that no one has ever uttered before or the acquisition of an item of knowledge one did not previously possess) would be of this sort, since to predict such events with any specificity would be to actualize a token of that event, so that it would no longer be a novel event after all. Since events of this kind will ramify in their causal consequences as well, they will also entail that many further events (such as my *hearing* the utterance of a sentence never before uttered) will also be unpredictable with any specificity. These ramifications will in turn apply to many other causal events that do not involve any sort of novelty but for which we would need to know those novel events in advance in order to predict them. Since we have no idea the extent to which those causal consequences will ramify, it is metaphysically possible that Goldmanesque books of life might amount in the end to mere pamphlets of life with as many blackouts and redactions in them as the typical NSA document that, no matter how trivial and tedious, is routinely marked “top secret” and treated as a matter of national security. Still, the unavailability of such books would not, after all, refute mechanism, and the scenario as sketched shows that mechanism remains a real metaphysical possibility for all of that. However, in the absence of such “books of life” we need to look elsewhere for that evidence and this proves more difficult than one might think.

 A more salient source of evidence against mechanism resides is our obvious and apparent ability to alter the projectible future by preventing foreseen events from occurring. We do this by taking precautions against them, seeing to it that the necessary and sufficient conditions for those events are either eliminated or the processes leading to that result are interrupted so that they fail to issue in their anticipated natural outcome, which we have sound reason to believe (counterfactually, based on past experience) would have almost certainly existed, occurred, or obtained had we not intervened to prevent that outcome. Indeed, we do this so often and so routinely that we take it for granted that this is something that lies within our power in all sorts of routine situations. More than this, our remarkably successful applied science and technology is no less grounded in and committed to the idea that nature, once understood, can to a very large extent be manipulated, controlled, and even altered to promote human flourishing and prevent various ontic evils (such as pandemic disease) from befalling us. All of this seems to be strong *prima facie* evidence against mechanistic fatalism.

 The mechanist, however, will tell us that all of this evidence is logically consistent with his or her own point of view. Because of our ignorance of the *real* causes of what is going on in the world and our limited knowledge of the full state of the world at any particular time, we suppose that our interventions in the natural order have some sort of independent causal efficacy and thus produces results in nature that otherwise would not have occurred and prevent other such results that would have occurred instead. The mechanist, once again, supposes that this is merely an illusion produced by limited knowledge. From the perspective of the “big picture,” all of our supposed “interventions” in natural processes are themselves merely the result of natural process that caused us to intervene in the way we did and were as fated as the non-occurrence of the events they supposedly prevented. In turn, given the full state of the universe at some previous time as their antecedent those interdicted event were never causally possible in the first place, but eternally excluded from existing, occurring, or obtaining by means of our so-called “intervention.” Whatever actually happens had to happen and whatever does not happen could not have happened given the actual prior history of the universe.

 Of course, the mere logical consistency of the mechanistic view with the *prima facie* evidence against it does not provide any positive argument for its truth or convert that evidence into empirical support for that point of view. To the contrary, one begins to wonder whether there even could be anything that *could* count as empirical evidence for the mechanist point of view in the actual world as we experience it. As we have seen, the pursuit of natural scientific investigation does not require mechanism either for its possibility or its success. That is amply provided for by the conditional necessity view. The reader may begin to suspect that mechanism is really a gratuitous extension of (= a mere imposition upon) scientific inquiry and research rather than something make or break for the possibility of real knowledge of nature. In what follows, I will try to reinforce that suspicion by arguing that there is not and could not be any empirical evidence, from science or from any other source, for mechanism conceived as part of a complete philosophy of nature.

 **Laplace’s Perfect Calculator**

Let us begin with Laplace’s perfect calculator.[[9]](#footnote-9) For my purposes here, I will be assuming that this calculator is a self-conscious rational agent with the power to affect the natural world through his or her actions, just as an ordinary human scientist would be. Such a being need not be omnipotent, just able to accomplish some routine actions that are well within the ordinary limits of the sorts of things that human beings can easily accomplish: move their limbs, kick things, and so on. Now, suppose that such a calculator is instantaneously provided with complete, detailed information about the physical universe at time T, comprehending every physical fact that obtains at that moment. According to Laplace, that individual would, in principle, be capable of comprehensive knowledge of every future state of the universe, thereby comprehending every future fact about that universe. However, I think there is significant reason to doubt that this could actually be the case.

Among the many facts that the calculator would know, or have access to at T, are facts about his or her own future. Now, of course, it is possible that mechanism is true and that this knowledge would be of no use to the calculator. Suppose *I* am the calculator. If the projectible future from the current, comprehensive state of the world at T from which that projection is made predicts that I will brush my teeth tonight, shave tomorrow morning, chew my first bite of steak exactly seventeen times before swallowing at dinner tonight, or get hit by a bus while running across “the Ave” in front of the UW bookstore tomorrow at Noon, then nothing that I can do in light of that knowledge at the current time can avert any of those future events from becoming actual in the course of time exactly as they were predicted. All of these actions are foreordained and ineluctable for me. However, this seems highly unlikely on the face of it. The fact that my knowledge of the physical facts of the universe at the present moment is comprehensive rather than partial does by itself not place any obvious limitations on my power to affect the future through my ordinary actions, something that I routinely experience myself to do. If so, it seems perfectly reasonable to suppose that I would retain this power even in those circumstances.[[10]](#footnote-10) In that case, it would *eo ipso* within my power to *falsify* at least one class of the claims included in the future projectible from the present, namely, all those claims concerning things, events, and states of affairs that can be affected and altered through my own actions. This, in turn, would falsify that projectible future and thus ensure the falsity of mechanism as well. As such, regardless of what that projection predicts, it remains within my power to falsify it by falsifying one or another of its predictions. This will hold even if I choose not to do so, just so long as I have no reason to suppose that I no longer retain the *power* to do so through the performance of some simple act that I suppose myself, on the basis of past experience, to be capable of, such as opting not to brush my teeth tonight, to skip my daily shave, chew my first bite of steak sixteen times instead of seventeen, or leave town to avoid being run over by the bus tomorrow at Noon. As the same time, my acquiescence in acting as the projection predicts for good and sufficient reasons does not have any tendency to show that I lacked such a power and so would not entail the truth of mechanism. Further, it would be easy enough to test this in practice; in that case, I think there is can be no serious doubt about the outcome if we were to try to falsify one or another of these predictions, especially since our doing so would employ no causal mechanisms than those that we already know lie within our power to employ. If that is so, then mechanism, with its attendant fatalism, is actually the myth, not my ability to alter the future. Further, this is an empirically significant test, since the contrary, Goldmanesque scenario is at least conceivable, and a test that I for one would be willing to venture.

The mechanist is not yet defeated, however. He or she may claim that the calculator’s knowledge of the projectible future based on knowledge of all of the physical facts that obtain at T throws a spanner in the works. Thus, my knowledge of every physical fact that obtains at T, including my own future acts as projectible from T, constitutes a further physical fact obtaining at some further moment T+1. This additional fact, comprehending as it does my ability to alter the future projectible from T, brings it about at T+1 that, supposing I will choose to falsify some of those claims projectible from T, that some other projectible future rather than that projectible from T, namely that projectible from T+1, is now (and always was) the actual future. Indeed, even if it is not, that will only be the case because I have not exercised my option to falsify any of the claims causally accessible to me as a result of my comprehensive knowledge of the state of the world at T. The combination of my knowledge of the future projectible from T and my ability to alter that future by my actions is sufficient to insure that the actual existence, occurrence, or obtaining of that projectible future is conditional on whether or not I decide to falsify some claim or set of claims concerning states-of-affairs that are causally accessible to, thus alterable, by me. That future from T, then, possesses merely conditional, not fatalistic, necessity for me.

The same, of course, will hold for the future projectible from T+1. I can only arrive at the future projectible from T+1 by knowing all of the physical facts obtaining at T+1. Once again, given that I continue to possess the standard complement or ordinary human abilities at T+1, among those facts will be facts about myself and about states-of-affairs causally accessible to and alterable by me at T+1. On the line of reasoning we are currently pursuing, this is sufficient to generate a further physical fact at the next moment, T+2, from which moment a different projectible future, which now once again turns out to be the *real* future, can be projected. However, all this amounts to is the denial of the Laplacean claim concerning the predictability of the future. Either we can, in fact, project the future from T or some subsequent moment, in which case that projectible future has at best conditional necessity, or no future is ever projectible at all from any moment by a self-conscious rational agent possessing causal powers, since that agent’s knowledge of what that projectible future is supposed to be puts him or her in the position of being able to falsify some of those predictions and thus generates an additional physical fact at the next moment from which a different future is projectible, making it the case that the future projectible from T never was the “real” future to begin with.

If that further fact at T+1 is accessible to us, then the future projectible from T+1 is also superseded, since our knowledge of what that future is supposed to be suffers the same fate as that projectible from T, given that knowledge will generate some further physical fact at T+2 that grounds a projectible future that is now revealed to have been the “real” future all along. If that fact, in turn, is accessible to us, then the future projectible from T+2 will likewise be superseded in favor of some further future projectible from T+3.[[11]](#footnote-11) If that fact is not accessible to us, then no future is projectible *at all* from T+3 due to our failure to possess sufficient information to project such a future - we do not and indeed cannot know *all* of the physical facts that obtain at that moment and thus are no longer Laplacean perfect calculators.

Should the mechanist take refuge in the idea that my ability to alter the future might be “outrun” by the causes - there will be a point at which the calculator gives out and a subsequent moment, say T+4, at which moment the calculator does not know all the physical facts obtaining in the physical universe - the following reply seems ready to hand. Regardless of what obtains at T+4, it will obtain only as a result of my earlier interference, or non-interference, at those earlier moments T+1-T+3. It is thus not predictable from any moment earlier than (say) T+3 and so does not represent the only future projectible from T, even if it happens to be the case that it is the very same future that I projected from T - I simply chose not to alter any of the predictions I made at T. In any case, then, the future is in my hands if I ever occupy the condition of a Laplacean calculator. This, again, is what we would expect if the Conditional Necessity view were correct.

Thus, either it is not possible for us to predict the future from any moment, even given complete knowledge of every physical fact that obtains at that time, or any future that can be projected from complete knowledge of every physical fact obtaining at that time possesses at best conditional necessity - it will obtain only if the causal series that produces it is not tampered with by any self-conscious rational agent. In neither case will there be any proof or evidence for mechanism deriving from this exercise, even if mechanism is true. Ironically, the only device that will keep mechanism from being obviously false puts it beyond the possibility of any empirical justification.

Even still, the mechanist is not yet completely done in. A mechanist could argue that the problem arises from a disputable supposition that I made at the beginning of this examination, namely, that the Laplacean Perfect Calculator has to be a self-conscious rational agent with causal powers in the real world. Instead, we could use a supercomputer, feed the data concerning all of the physical facts about the world at T into that computer and then program it to calculate the future projectible from those facts as its output. Since the computer possesses neither knowledge of what it is doing or any awareness of the world around it, thus lacking any accessibility to those states-of-affairs or causal powers to affect them, it can easily calculate its own future states as part of that projectible future without introducing any problems of self-reference.[[12]](#footnote-12) Further, in order to prevent tampering, we will make sure that this output is stored in a vault someplace protected from prying eyes so that no one knows, in advance, what any of the predictions are. Then we will arrange to publish occasional reports of randomly selected past moments in order to show that the predictions made by the computer exactly coincide with what actually happened at that moment. In that case, one might suppose, we have genuine empirical evidence for mechanism.

Not necessarily, however. The conditional necessity view presented above can accommodate these reports and explain them in its own terms in such a way as to call the research methodology involved in this project into question. The fact that the predictions and the actual facts exactly coincide does not prove that they happen with fatalistic, as opposed to merely conditional, necessity. Indeed, the entire project is designed to prevent any *real* test of the predictions made by the computer by keeping them secret. This has the effect of insulating those predictions from any sort of interference that could falsify them, thus guaranteeing that they will exist, occur, or obtain even if they possess only conditional, as opposed to fatalistic, necessity. So, after all, this is not a fair trial of the two theories and the proponent of the conditional necessity view will challenge the mechanist to make public the computer’s predictions about some time that is future in relation to the time at which they are revealed, with full confidence that it will lie within our power to falsify at least some of those predictions and refute mechanism. The evidence, then, does not unambiguously support mechanism after all and the conditional necessity view remains in the field even in such a case. Of course, this does not prove that mechanism is false. However, it strongly suggests that there is, and in the nature of the case cannot be, any compelling empirical evidence for the truth of mechanism. Although there are apparently some people who *want* mechanism to be true, I suppose that most of us will be relieved to find that, even if mechanism is true, we have and can have no compelling reason (scientific or otherwise) to believe this.

At the same time, there appears to be nothing either incoherent or problematic about the conditional account of causal necessity presented above. In fact, it comports better with ordinary experience, our common sense beliefs, and the practice of applied science than with what we would expect to be the case if mechanism were true. I can see no reason, then, why we should not adopt the conditional necessity view in preference to the fatalistic necessity view typically taken to be the concomitant of mechanism. If we do, there is no longer any reason to suppose that the necessity inherent in causal processes requires, or even supports, (e.g.) the Causal Closure principle in any but the most trivial and innocuous form. For precisely the same reason, neither is the causal necessity inherent in physical events incompatible with miracles, free will, or the in principle possibility of the mental causation of bodily events. These, however, are discussions for another time.[[13]](#footnote-13)

1. Indeed, my differences from the mechanist view are more profound than this - I altogether reject the New Science’s account of efficient causation. See my “What we should Learn from Hume’s Critique of “Causation,” in preparation. [↑](#footnote-ref-1)
2. See, for example, D. J. B. Hawkins, *Being and Becoming*, London, Sheed and Ward, 1954, 137-162, which I read only after writing the text of this paper. This interpretation of Aristotle draws further support from Aristotle’s discussion of chance events: see below, note 3. [↑](#footnote-ref-2)
3. For example, see Yves Simon, *The Great Dialogue of Nature and Space*, Albany, NY, Magi Books, 1970, 184-190 and Jacques Maritain, *A Preface to Metaphysics*, New York, Sheed and Ward, 1943, 141-151 for an account of Aristotle’s doctrine of chance events. [↑](#footnote-ref-3)
4. Descartes affirms this position from a theological determinist perspective in his treatise, *The Passions of the Soul*, in *CSM*, Vol. I, 380-1, which entails an almost complete theological fatalism of the sort associated with popular Islamic views of divine providence like those expressed in the *Rubaiyat* (quoted below). Although Spinoza is more famous for having held this view, Descartes also draws a distinction between what lies within our control (our acts of believing and internal attitudes to external circumstances) and what does not (the state and condition of the external world and how it affects our bodies.) For Descartes, our freedom of action is apparently only indirect and limited to the mind, which can choose to resist the impulsion of our desires and other passions through reliance on emotions produced solely by the mind and thus prevent them from dictating what we will do. He thus recommends the cultivation of virtue as the best guide to the avoidance of domination by irrational passions that direct us to pursue causally impossible ends: op.cit. 381-2. [↑](#footnote-ref-4)
5. For my account of causal possibility and necessity, see my essay “Material Necessity,” also on this website, 26-30. [↑](#footnote-ref-5)
6. See my “What We should Learn from Hume’s Critique of “Causation,” in preparation. [↑](#footnote-ref-6)
7. "Actions, Predictions, and Books of Life," *American Philosophical Quarterly* 5: 135-151 (1968). [↑](#footnote-ref-7)
8. Karl R. Popper, *The Open Universe*, New York, Routledge, 1982, 62-67. [↑](#footnote-ref-8)
9. The argument I am giving here seems to me to have a lot in common with Popper’s argument in *The Open Universe*, 68-77and may be superseded by it. However, given the complexity of Popper’s statement of the argument, it is difficult for me to gauge the degree of overlap between these two arguments. Popper suggests that simpler versions of the argument may be possible, in his 1957 Preface to *The Poverty of Historicism*, New York, Routledge, 2005, xii. A simpler presentation of the argument may make it more intuitive; that is what I hopefully am offering here. [↑](#footnote-ref-9)
10. As Keith Lehrer argues in his neglected paper “An Empirical Disproof of Determinism?” in Keith Lehrer, ed., *Freedom and Determinism*, Atlantic Highlands, NJ, Humanities Press, 1976, 175-202. Lehrer argues that, in a perfectly straightforward sense, I am often justified, on empirical grounds, in believing that there is more than one thing that I can do at a particular time. For example, in ordinary circumstances, I have it within my power to raise my arm in response to a request to do so, and also to refrain from doing so under the same circumstances. The latter is evidenced by the fact that I am currently not raising my arm, so that the physically necessary conditions for my refraining from doing so already obtain. My belief that it lies within my power raise my arm in those circumstances rests on the demonstrated fact that I have done so in the past and that the current circumstances are not relevantly different from those that obtained on previous occasions when I raised my arm in response to a request. The future is thus physically and causally open inasmuch as the physically necessary conditions for my raising my arm or refraining from doing so both obtain at the current moment - neither is ruled out and both are physically and causally possible *so far forth*. Similar considerations apply here as well. I thank Art DiQuattro for directing my attention to this paper, which I read many years ago but whose point did not appreciate as I ought to have. [↑](#footnote-ref-10)
11. Indeed, it is impossible, simply as a matter of logic, to predict one’s own future acts or the acts of anyone else who is a self-conscious rational agent. This is forcefully argued in Bangs L. Tapscott, “Deterministic Predictions,” in Donald F. Gustafson and B. L. Tapscott, eds., *Mind, Body, and Method: Essays in Honor of Virgil C. Aldrich*, Dordrecht, Holland, Reidel, 1979, 297-302. See also Popper, op. cit. In that passage, Popper claims, contrary to what I am assuming in the next paragraph, that not even a computer could predict the future prior to its occurrence. He may be right about that; however, I do not find his argument on this point either clear or convincing. [↑](#footnote-ref-11)
12. Here my argument touches on the Godelian argument developed by J. R. Lucas to argue for an essential difference between a human mind and a computer, however complex. For his most recent, and probably final, discussion of this argument see his paper “The Godelian Argument,” which can be found online at <http://www.leaderu.com/truth/2truth08.html> - posted 10/28/2010. This paper is a good review of the history of the argument and a response to the standard criticisms that other philosophers have offered to it. [↑](#footnote-ref-12)
13. See my “Objections to Dualism,” in preparation. [↑](#footnote-ref-13)