MARK BALAGUER

LIBERTARIANISM AS A SCIENTIFICALLY REPUTABLE VIEW

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I. INTRODUCTION

It is widely believed that libertarianism is not a scientifically reputable view, that it flies in the face of current scientific thought. In this paper, I will show that this is a confusion, that libertarianism does *not* fly in the face of current scientific thought and that it is just as scientifically reputable as any view that opposes it. Moreover, at the end of the paper, I will say a few words to motivate the claim that my response to this *particular* argument against libertarianism actually suggests that *none* of the traditional arguments against libertarianism could be cogent. (In connection with this last point, I won't discuss any of the details of these other anti-libertarian arguments; what I will do is provide a very *general* argument for the claim that the *sorts* of anti-libertarian arguments that we find in the literature could not be cogent.)

I take libertarianism to be the view that human beings are capable of actions and decisions that are (a) undetermined and (b) non-random in a certain yet-to-be-specified sense. (Two points. First of all, I acknowledge that this definition is extremely vague, since we don't yet know what this non-randomness consists in, and also that it is crucially important that libertarians say something about this, since one of the main worries about their view is that it is unclear *how* our actions and decisions could be simultaneously undetermined and appropriately non-random. The worry here is, of course, that it seems, *prima facie*, that any event which is undetermined *just happens*, i.e., happens without reason, i.e., happens randomly. Much of this paper will be concerned with addressing this worry. Second of all, to give myself a non-cumbersome *term* to use here, I will say that a person who has the capacity for undetermined and appropriately

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non-random decisions has *free will*. Whether or not there are *other* capacities that might reasonably be called 'free will' – capacities that are compatible with determinism and, perhaps, sufficient for things like moral responsibility – will be entirely irrelevant here. I am concerned with the question of whether human beings possess the capacity for undetermined and appropriately non-random actions and decisions, *regardless* of whether this capacity is necessary or sufficient for anything like moral responsibility. Moreover, I have no particular attachment to the *term* 'free will' – I could just as easily use 'capacity L'.)

The standard argument against the scientific reputability of libertarianism proceeds in something like the following way. "It seems very likely that

(1) Mental events like decisions supervene on physical events, in particular, *neural* events.

But this suggests that

(2) If any of our decisions are undetermined by prior physical events, it is because there are some neural events in our brains which are undetermined by prior physical events.

But

(3) Any neural event which is undetermined by prior physical events occurs *randomly*, or *without reason*.

And so (relying again upon the supervenience thesis) it seems to follow that

(4) If our decisions are undetermined, then they occur randomly and, hence, are not non-random in any appropriate (i.e., libertarianesque) sense.

Now, this isn't a *knockdown refutation* of libertarianism, because libertarians can respond by rejecting (1) and claiming that human actions flow from immaterial *Cartesian Minds* (or *agents*, or some such thing) which exist outside the normal causal nexus but are capable of making decisions and jumping into causal sequences and directing actions. But this sort of mind/brain dualism is incompatible

with current scientific thought about the mind/brain. In other words, the appeal to things like Cartesian Minds is mysterious and non-scientifically-reputable; thus, since this seems to be the libertarian's only avenue of response to the above argument, it follows that libertarianism is *also* mysterious and non-scientifically-reputable."

I do not intend to deny that the rejection of (1) is non-scientifically-reputable. I believe that (1) is true and that Cartesian dualism is false, and I will take these claims as working assumptions in this paper. What I propose to do is this. In Section 2, I will sketch a novel version of libertarianism – which I will call *neurological libertarianism* (or NL for short) – which endorses (1) but rejects (3); in a nutshell, the view is that we have free will because of the nature of our *brains* – in particular, because some neural events are undetermined and appropriately non-random.[1] In Section 3, I'll give a version of the argument from scientific reputability which is aimed directly at NL, as opposed to libertarianism in general. In Sections 4 and 5, I will respond to this argument. And in Section 6, I'll say why I think it's plausible to suppose that we presently have *no* good reason to disbelieve NL (and, hence, no good reason to disbelieve libertarianism).

Before diving into all of this, however, it will behoove us to reflect for a moment on what the *opponents* of NL believe. The important point to note here is that they needn't endorse determinism, or as I will call it, *universal determinism*. This is the view that all events are causally necessitated by prior events, i.e., that (a) every event has a cause, and (b) all causes necessitate their effects. Opponents of NL are not committed to universal determinism, and it would be extremely uncharitable to assume that they endorse it, because these people want to claim that their view is supported by current scientific thought, but universal determinism is certainly *not* so supported. Indeed, if empirical science supports anything in this connection, it's the *negation* of universal determinism, i.e., *indeterminism*, for the standard interpretation of quantum mechanics entails indeterminism. Now, this isn't a knockdown argument for indeterminism, because there is a *non*-standard interpretation of quantum mechanics – viz., Bohm's hidden-variables theory[2] – which is deterministic. But while Bohm's theory hasn't been completely *refuted*, it has been widely *rejected*; thus, we might say that current scientific thought gives

us *some* reason, although not conclusive reason, to adopt indeterminism. But in any event, the important point to note here is that it is clearly false to suggest that empirical science lends support to universal determinism. I will say more about this below.

So what do opponents of NL believe then? Well, there are two views they can adopt which are consistent with indeterminism, i.e., with the falsity of universal determinism. The first is *neurological determinism* (or ND) which holds that all neural (and mental) events are causally necessitated by prior neural (and other bodily) events. And the second is *indeterministic randomism* (or IR) which holds that there are undetermined neural (and mental) events but that no such event is appropriately non-random, i.e., non-random in a libertarianesque sort of way. (It should be noted that whereas NL and IR are indeterministic views, ND is consistent with both indeterminism and universal determinism: it's consistent with universal determinism, because it's *entailed* by that view, and it's consistent with indeterminism, because it could be that while *some* events are undetermined, none of these events are *neural* events. The most plausible view here – or, at any rate, the most popular – holds that (a) the *only* undetermined events are *quantum* events, and (b) all quantum indeterminacies get "canceled out" somehow before we get to the macro-level. I will discuss this in more detail below.)

Assuming that (1) is true, the weakest (and, hence, most plausible) view that opposes NL is the view that commits only to the disjunction of ND and IR. Thus, this is the view I will concentrate on.

II. NEUROLOGICAL LIBERTARIANISM

In this section (and section 4), I will introduce what I think is a new libertarian stance. Now, the view I have in mind – viz., NL – still holds that human beings are capable of actions and decisions which are (a) undetermined and (b) appropriately non-random. Thus, to understand how NL-ists differ from traditional libertarians, we need to look at how they *unpack* these two claims. I begin with the claim of indeterminacy.

NL-ists endorse a very specific sort of indeterminism: they *accept* the claim that every event has a cause but *deny* that all causes necessitate their effects.[3] Thus, the NL-ist's claim that some neural

events are undetermined amounts to this: if some human being, say Charlie, is in brain state q_0 at time t_0, then the laws of physics (or biology or neurophysiology) do not pick out a unique next brain state for Charlie; instead, there is a list $q_1, \ldots, q_n$ of physically possible next brain states, i.e., brain states that could, without violating any law of nature, be Charlie's next brain state.[4] Now, again, NL-ists do not want to claim that there are uncaused neural events; thus, if Charlie's brain passes at time t_1 from q_0 to, say, q_{17}, NL-ists will admit that this event was *caused* by Charlie's being in q_0 together with the inputs (i.e., physical signals) to Charlie's brain between t_0 and t_1; they will simply maintain that the shift to q_{17} wasn't *necessitated* by these things.[5,6]

The NL-ist's claim of *appropriate non-randomness*, on the other hand, can be understood as follows. Let us suppose that at time t_0 in the above case, Charlie starts making a decision to get up and get a drink of water and that at time t_1, he finishes making the decision and actually gets up. Then NL-ists claim that the change of state in Charlie's brain from q_0 to q_{17} is bound up with his decision in such a way that there is no way to understand how Charlie succeeds in making a free (i.e., undetermined and appropriately non-random) decision without understanding how Charlie's brain proceeds from q_0 to q_{17} – i.e., without understanding the neurophysiology of his decision.[7] Now, NL-ists do not want to commit to any *particular* story about the relationship between decisions and brain-state shifts – or, more generally, between the neural and the mental – because they think that we are currently too ignorant about neurophysiology to know what ought to be said in this connection. All NL-ists want to claim here is that genuinely free (i.e., undetermined and appropriately non-random) decisions are bound up with indeterministic and appropriately non-random brain-state shifts *in some way or other*. Thus, NL-ists believe that (a) we do make undetermined and appropriately non-random decisions and these decisions do arise out of the ordinary workings of the sub-atomic particles in our brains; (b) there is no way to understand *how this works* without understanding how our brains evolve while we are making these decisions; and (c) as of right now, we cannot even begin to understand how any of this works, because we are currently too ignorant about the mind/brain. Thus, for now, NL-ists want to rest content with a very *general* for-

mulation of their theory; they do not want to commit to any claims about how the theory is neurologically realized.

The idea here is that a theory that explained how brains proceed from state to state would bring *with* it an account of how our decisions are bound up with brain-state shifts and how they are simultaneously undetermined and appropriately non-random. But I do *not* think that a theory of how we make undetermined and appropriately non-random decisions could be, so to speak, "lifted straight off of" the imagined neurophysiological theory. To arrive at such a theory of decisions, we would have to combine the neurophysiological theory with some folk psychology, or some cognitive science. This is simply because folk terms like 'decision' cannot be *eliminated*, i.e., defined in purely neurophysiological terms. Given all of this, NL-ists claim that the question of how undetermined and appropriately non-random decisions arise out of the ordinary workings of particles within human brains is a question for *neuro-cognitive science*. And the question of *whether* human beings make such "genuinely free" decisions is also a question for neuro-cognitive science. NL-ists think that we do make such decisions, but they do not think that this is *a priori*. They think that neuro-cognitive science has the last word on this question, and so they think that it's an *empirical* question.[8]

In any event, the main question that arises at this point is whether it is *acceptable* for NL-ists to leave their view general or imprecise in the above manner. In Section 3, I will present an argument for thinking that it is *not* acceptable, and in Sections 4 and 5, I will respond to that argument and show that it *is* acceptable.

But before I do this, I would like to say a bit more about NL. In particular, I want to make a few points about how NL differs from more traditional versions of libertarianism. Now, the most important difference here is the one I have already emphasized, namely, that NL-ists do not commit to any mysterious mental entities, e.g., souls or agents, which are taken to be external to the physical world. The view here is that free decisions are purely naturalistic, materialistic phenomena; when physical particles are arranged in certain ways (e.g., brain-type ways) they give rise to various sorts of conscious phenomena, and among these are genuinely free decisions. Thus, when a free decision is made, we don't have an intrusion from outside the flow of physical stuff; it's just that at this point in spacetime, the

flow is undetermined and non-random in an appropriate, libertarian sort of way. (In terms of the above example, the point here is that Charlie's decision doesn't *cause* his brain to proceed from q_0 to q_{17}; as I said above, NL-ists take q_{17} to be a straightforward causal effect of q_0 and the inputs to Charlie's brain between t_0 and t_1. What NL-ists think is that the shift from q_0 to q_{17} is *the neurophysiology of the decision*; that is, when Charlie's brain is shifting states here, he is making his decision. This seems to suggest that the decision *supervenes* on the brain-state shift, but NL-ists do not commit to anything *more* than this, e.g., whether the decision is *identical* with the brain-state shift, or *emerges out of* the brain-state shift, or for that matter, bears some other relation to the brain-state shift that hasn't yet been thought of.)

Related to all of this is that NL-ists do not take decisions to be abnormal among mental events. The problem of understanding how decisions are bound up with neural events is a special case of the more general problem of understanding the relationship between the neural and the mental. To describe the neurology corresponding to a decision is a lot like describing the neurology corresponding to recognizing a face. Also related to this is that NL-ists do not take genuinely *free* decisions to be abnormal among decisions. It seems to me that if our "important" decisions involve undetermined and appropriately non-random brain-state shifts, then (many of) our "unimportant" decisions – e.g., Charlie's decision to get a drink of water – probably do too. And a third related point is that if NL is right, then it might very well turn out that *parakeets* have free will. If we are free, then the seat of this freedom is not anything particularly noble, or dignified, or human – it is the *braininess* of our brains. Now, I have no idea how far down the evolutionary scale freedom extends; earthworm actions might be just as undetermined as human actions are, but it is doubtful, at this level, that they are appropriately non-random. But these are questions for neuroscience – it *might* turn out that earthworms *are* free or that parakeets *aren't*. (Which sorts of animals have free will is going to depend, I suppose, upon what appropriate non-randomness turns out to consist in.)

Finally, while NL-ists don't endorse *traditional* compatibilism, they do endorse a different, more *genuine*, form of compatibilism, one that holds that genuine (i.e., libertarian) freedom is compatible

with the thesis that every event has a cause. NL-ists believe that our decisions are part of the causal nexus and that they are caused by prior physical events; but they also believe that these decisions aren't necessitated by such events and that they are non-random in an appropriate, libertarian sort of way.

III. THE CASE AGAINST NL

In Section 1, I sketched an argument against the scientific reputability of libertarianism. The main point of that argument was that (a) libertarians seem committed to some sort of mind/brain dualism, but (b) current scientific thought suggests that that philosophy of mind is false. Now, NL avoids this particular point, because it *doesn't* commit to dualism; but it is not hard to see how the argument of Section 1 can be brought to bear against NL. For recall that the *reason* libertarians seemed committed to dualism was that this seemed to be the only way of maintaining that our decisions are undetermined by prior physical events without *also* claiming that they occur randomly, or without reason. Given this, the challenge to NL-ists can be stated as follows.

"If NL-ists maintain a materialistic philosophy of mind, i.e., if they admit that (1) is true, then they owe an account of *how* our decisions could be simultaneously undetermined and appropriately non-random. The point is that we don't know if NL is a scientifically reputable view, because we don't know what the view *is*. At present, the only real suggestion we have for how a decision could be simultaneously undetermined and non-random is the non-scientifically-reputable Cartesian suggestion; thus, what NL-ists need to do is provide a more detailed formulation of their view. They cannot leave their view 'general' in the manner of Section 2 – or 'vague' in the manner of Section 1 – because to do this is simply to *gloss over* the central worry about libertarianism, i.e., the worry that it might not be possible to formulate the view in a detailed, intelligible, and scientifically reputable way, because it may be that there is simply no way for a physical event to be simultaneously undetermined and appropriately non-random. So NL-ists have to say *how it could be* that certain brain-state shifts are simultaneously undetermined and appropriately non-random (i.e., how it could be that (3) is false) and,

moreover, they need to say what this 'appropriate non-randomness' *consists* in. Or to put the challenge another way, NL-ists have to say how our decisions could be undetermined and appropriately non-random, given that they arise out of the ordinary movings about of elementary particles."

This challenge is obviously directed toward the claim of *non-randomness*. We have a somewhat clear conception of what it would be like for brain-state shifts to be undetermined by prior bodily events (and, indeed, as we saw in Section 1, there is fairly good reason to suppose that the world actually *is* indeterministic). But we have no conception whatsoever of how indeterministic brain-state shifts could occur in an "appropriately non-random way," i.e., in a libertarianesque way.

IV. IN DEFENSE OF NL

The first point I want to make here is that we have absolutely no reason to think that it's *impossible* to provide a clear, intelligible, and non-mysterious (i.e., scientifically reputable) formulation of NL. What seems right is that (a) no one has done this *yet*,[9] and (b) it would be very *difficult* to do this. But I don't know of any argument suggesting that it *can't be done*. There are dozens and dozens of arguments in the free-will literature that are supposed to show that libertarianism is "obscure", or "mysterious", or some such thing. But none of these arguments do anything more than point to certain *puzzles*, e.g.: "How could human actions and decisions be non-random in a libertarian sort of way, given that they are undetermined and that they arise out of the ordinary movings about of elementary particles?" My point here is that no one has ever provided any reason for thinking that puzzles like this *cannot be solved*.

The next point to be made is this. From our current epistemic vantage point – i.e., given our current dearth of knowledge about the mind/brain – it seems quite possible that puzzles of this sort *could* be solved. That is, it seems *possible* that, one day, we could develop a neurophysiological theory that "brought with it", or led to, a very clear formulation of NL, i.e., a very clear explanation of exactly how human decisions are undetermined and appropriately non-random. In other words, it seems possible that if we were suddenly presented

with a true and complete neurophysiology, we would slap our foreheads in amazement and say: "Oh, *now* I see it. The evolution of the brain really *is* non-random in an appropriate sort of way. See, when the neurons are doing *this* kind of thing, the person's making a decision. So I guess the best thing to say is that the libertarians were right, although they certainly didn't know that it was going to turn out like *this*. Decisions really *are* undetermined and non-random in a sort of libertarianesque way."

Now by themselves, these remarks don't constitute a response to the problem of formulation described in the last section. This is simply because I haven't provided the requested formulation of libertarianism. But what I want to argue is that libertarians *don't have to provide the requested formulation* in order to defend their view. I will do this by arguing that it is more than *possible* that NL will turn out true; I will argue that – given our current knowledge about the mind/brain – it is *no less likely* that NL will turn out true than that ND or IR will turn out true.

Most libertarians seem willing to concede that arguments like that of the last section place some sort of "burden of proof" on them. That is, they think that the onus is on them to provide a clear, detailed, and scientifically reputable formulation of their view. Thus, for instance, Wiggins dedicates a paper to finding "a reasonable libertarianism," Kane dedicates a book to explaining how libertarianism can "be made intelligible without appeals to obscure or mysterious forms of agency," and Nozick tries to "formulate a conception of human action that leaves the agent valuable."[10] I think it is a mistake for libertarians to admit that there is any sort of "burden of proof" on them in this connection. Moreover, I think that, given our current state of knowledge about the mind/brain, libertarians have no real hope of providing what determinists really *want* here, viz., an account of how our decisions could be appropriately non-random, given that they are undetermined and that they arise out of the ordinary workings of elementary particles.[11] So I want to respond to the argument of the last section in a different way. I want to argue that (a) libertarians are not alone in their futility, i.e., that ND-ists and IR-ists cannot respond to analogous challenges to their views, and (b) libertarianism is currently no less plausible than ND or IR.

It seems to me that NL-ists, ND-ists, and IR-ists can all provide general sketches of their views but *none* of them can do any better. In Section 2, I provided a general sketch of NL, but I did not say exactly *how* decisions are bound up with brain-state shifts, i.e., how they arise out of the ordinary workings of sub-atomic particles. I said that NL-ists need not attempt to fill in the details of their view right now, that they can wait until they are better equipped (with much more knowledge about the mind/brain) to do so. The reason this stance is acceptable is that ND-ists and IR-ists are in very similar situations. Consider ND-ists. They think that brains pass from state to state of necessity, but they can't say how this works. And it is not as if ND is *obvious* and that waiting for an account of how it works is waiting for the inevitable. Far from it; given what we know about the behavior of quantum systems, it is not clear how *any* macro-level event could be determined, let alone a *neural* event. ND-ists often claim that quantum indeterminacies could get "canceled out" somehow before we ever reach the macro-level, but while it certainly seems *possible* that something like this happens, we have no idea *how* it might happen. Thus, it seems to me that claiming that quantum indeterminacies get "canceled out" is like claiming that appropriately non-random decisions arise out of the ordinary workings of sub-atomic particles: from our current epistemic vantage point, it seems that both of these claims *could* turn out true, but in neither case do we have a clear conception of *how*.

I should also note here, for those who find the NL-ist stance an "odd" one, that the "cancel-out" thesis seems to commit ND-ists to an odd view as well. For the suggestion here is that at the most fundamental level of the universe, there is a slack in the causal relations of nature but that as we proceed to a higher level, the causal relations of nature suddenly become binding. This seems to be an exceedingly odd view, and as we will see, one that is *wholly* unmotivated. (And here, by the way, is a *second* oddity about ND: suppose that I hold my hand out and tell you that I'm going to count to three and then move it to either the left or the right, and then upon counting to three, I move it to the *left*; then ND-ists have to claim that it would have violated the laws of physics – or neurophysiology, or whatever – for me to have moved it to the right. Again, this seems to be a very odd claim. And it is not a mere extrapolation from what

we already have: there is *nothing* in current scientific theory that even loosely *suggests* that this claim is true.[12])

Now, one might think that there is a fairly obvious line that ND-ists can take in explaining how the macro-level could be deterministic while the quantum level is indeterministic. In particular, one might think they can say something like this: "Macro-level phenomena consist of huge numbers of elementary particles; thus, even though the particles themselves behave stochastically, huge ensembles of them will be extraordinarily predictable, because the Law of Large Numbers will kick in, and the actual frequencies will coincide extremely closely with the probabilities." First of all, we will see in a moment that there is reason to doubt that this view – or for that matter, *any* version of the "cancel-out" view – is *right*. But what I want to point out now is that none of this solves the problem with ND, because the view in question here is simply *not* a version of ND; it is a version of IR, because it takes the macro-level to be *in*deterministic. (What the appeal to the Law of Large Numbers explains is not how the macro-level could be deterministic while the quantum level is indeterministic but, rather, how the macro-level could be predictable while the quantum level is unpredictable. Perhaps it also explains how the macro-level could be *determined for all practical purposes*[13] while the quantum level is indeterministic, but this doesn't change the fact that the view in question is a version of IR and not ND.)

The obvious question that arises now is whether IR is any better off than ND or NL. It seems to me that it's not, that IR-ists do not have a detailed, scientifically reputable formulation of their view and, more importantly, that there isn't a shred of evidence for thinking that IR is true, i.e., for thinking it more likely that a true and complete neurophysiology would vindicate IR than NL or ND. To see that these claims are correct, consider where we currently stand with respect to the question of whether IR, NL, or ND is correct: (a) what we have here are three views about how brains proceed from state to state, but (b) we are *colossally ignorant* on this topic. What we would really need in order to settle our dispute is a theory of one of our three types that gave so much detail about how brains pass from state to state that we could simply look at some brains and see if the theory was correct. But we are obviously nowhere near having such a theory: we're so ignorant about how brains proceed from state to

state, and how conscious phenomena like decisions are bound up with neurological phenomena, that any theory along these lines is going to be embarrassingly speculative and scientifically useless, i.e., untestable.

It is important to note that NL is really on *equal footing* with IR and ND here. My point is not simply that we need to acknowledge the *possibility* that a true and complete neurophysiology could vindicate NL; it is that, as of right now, we have *no reason whatsoever* for thinking that it's even *slightly more likely* that a true and complete neurophysiology would vindicate ND or IR than NL. The reason is that we just don't know much of anything about how brains evolve during decisions, and so we have no basis on which to make a judgement here. In other words, the point is that current neuroscience doesn't say anything about the points on which our three theories disagree.

Now, one might wonder why, if this is right, there is such a wide-spread feeling that libertarianism doesn't fit with a scientific worldview. The reason, I think, is very simple: there has been an appalling lack of subtlety in our thought about libertarianism. A few people have formulated versions of libertarianism that appeal to mysterious notions like agent causation and Cartesian minds (and that seem, for this reason, to be not scientifically reputable) and, somehow, everyone has concluded that appeals of this sort are the *only hope* for libertarianism, that there is no way that undetermined and appropriately non-random events could arise out of the ordinary (non-rational) workings of elementary particles. Moreover, the few libertarians who do endorse physicalism, e.g., Kane and van Inwagen, have not said anything to block this basic worry about the ultimate physical *causes* of our decisions. But the simple fact is that we never had any *argument* behind this worry in the first place: there is *absolutely no reason* to think that undetermined and appropriately non-random events *cannot* arise out of the ordinary workings of elementary particles. This is the insight behind NL: from our current epistemic vantage point, it seems that (a) genuinely free decisions *could* arise out of the ordinary workings of elementary particles (arranged into a brain) and, moreover, that (b) we have no more reason to suppose that such decisions *don't* arise out of such workings than that they do. Now, I admit that it's *hard to see* how

genuinely free decisions could arise out of the ordinary movings about of sub-atomic particles, but that is irrelevant. After all, it's hard to see how *any* mental events, or conscious experiences, could arise out of the ordinary movings about of sub-atomic particles, but almost everyone working in neuroscience, cognitive science, and the philosophy of mind agrees that such events and experiences *do* arise out of such movings about.

I don't see how opponents of libertarianism could respond here. That is, I don't see how they could mount a cogent *argument* for the claim that our decisions couldn't be – or even *aren't* – undetermined and appropriately non-random. For since we are so ignorant about neurophysiology, we have no idea what this appropriate, libertarianesque non-randomness might be *like*. (It might seem odd that I have turned the vagueness of NL around and used it as a weapon against opponents of libertarianism. But remember the dialectical situation we are in: I am *not* trying to argue here that NL is true; I am only trying to block a certain argument *against* libertarianism.)

Perhaps it will strengthen my point here to note that, *prima facie*, there seem to be numerous ways in which NL could turn out true. First of all, as we will see in a moment, it might very well be that the "cancel-out" thesis is simply false and that quantum indeterminacies "mushroom" into neural indeterminacies that are relevant to free will. Second, it may be that the "cancel-out" thesis is *largely* true – that *most* quantum indeterminacies "cancel out" before we reach the macro-level – but that it is not *universally* true and, in particular, that it is not true of *brains*. Third, even if the "cancel-out" thesis does apply to brains – or more to the point, even if quantum indeterminacies are wholly irrelevant to free will – it might be that *other* indeterminacies are *generated* at the macro-level. (Such indeterminacies might arise *only within brains* or they might arise *all over* the macro-level, although, of course, the view would be that we only get appropriate non-randomness within brains.) Fourth – and this seems to me the most likely of the four possibilities and also the most important point to note in this connection – it might be that undetermined and appropriately non-random neural events occur by means of some process that we simply haven't thought of yet and, indeed, that we aren't even *close* to being able to imagine.

One might object to the second and third of these possibilities in something like the following way. "We cannot seriously believe that either of these possibilities is actual, because they seem to entail that brains are, in some sense, *metaphysically special* – that they are different from rocks and chairs and trees, that they are outside the natural order." But in fact, the second and third possibilities entail no such thing. For one might hold that brains are part of the natural order – that they are made of the same stuff and subject to the same laws as the rest of the universe – but maintain that, because of their unique and complex *structure*, brains are very special sorts of things, radically different from rocks and chairs in numerous ways. The bottom line is this: brain-type arrangements of elementary particles *do* give rise to some rather extraordinary phenomena, most notably, *conscious experience*; thus, it doesn't seem to me at all implausible to suppose that they give rise to undetermined and appropriately non-random decisions.

We can provide further motivation for the claim that IR and ND are on no better scientific footing than NL – that they cannot right now be formulated in more scientifically reputable ways and that we do not currently have any scientific reason for favoring them over NL – by taking note of a connection that exists between the issues we are discussing here and the *problem of measurement* in quantum mechanics. The problem of measurement, in a nutshell, is to account simultaneously for the facts that (i) in non-measurement situations, quantum systems seem to evolve across time in accordance with the Schrödinger equation, which is a *deterministic* law, and (ii) in certain measurement situations – viz., those involving a measurement of an observable quantity A on a system that is currently in a superposition state with respect to A – we find that systems evolve in accordance with the collapse postulate, which is *indeterministic*. Now, it is important to note here that it is not quantum systems by *themselves* that behave indeterministically in (ii), but rather, *joint* systems, i.e., systems consisting of quantum particles together with *macro-level* measuring devices. This seems to provide some motivation for thinking that the (universal version of the) "cancel-out" thesis is simply *false* and that there must be macro-level indeterminacies. But regardless, the point I really want to make here is this: there is no way we can even *begin* to see how we might fill in the

details of ND, IR, or NL – and, hence, no way to mount any empirical evidence for any of these views – without first solving the problem of measurement. For until then, we will not even be clear about what is going on when quantum systems (or joint systems) behave indeterministically, let *alone* how these indeterminacies effect the determinateness of macro-level events, and *least of all* how they effect the determinateness of *neural* events.

Thus, since we *don't* know how to solve the problem of measurement right now, we are simply nowhere *near* knowing whether quantum indeterminacies are relevant to the issue of free will – or *how* they might be relevant to it. The bottom line is that we simply don't have any clue whatsoever as to the sorts of indeterminacies that might be at work within ordinary brains. We don't know the effects of the indeterminacies of the quantum particles within brains, and we don't know whether the peculiar and complex structure that brains have does anything to generate *new* indeterminacies (analogous to the way that this structure generates conscious experience). Moreover, we *certainly* don't know whether this peculiar structure renders any of the indeterminacies that might be at work within brains *non-random* in a way that we would deem an appropriate, libertarianesque way. To pretend otherwise would be to assume that we know radically more about the mind/brain than we actually do.

Libertarians are often accused of engaging in speculative metaphysics. I agree with the spirit of this criticism, although I would call it speculative physics and neurophysiology. But the point of this section has been to argue that ND-ists and IR-ists are just as guilty on this score. This is really the main point of the entire paper: ND and IR are highly speculative views about the physical world (in particular, the mind/brain) which are unmotivated by current scientific theory and which lack precise formulations that could lead to confirmation. Thus, the fact that libertarianism is *also* such a view does not, as is often supposed, place any sort of "burden of proof" upon libertarians.

V. TWO OBJECTIONS

If the picture that I've been presenting here is roughly correct, then any claim to the effect that there is empirical evidence for one of

our three views would seem highly dubious. But Ted Honderich has claimed that we do have neurological evidence for ND, and so one might fear that I have misrepresented things somehow. That fear is short-lived, however, because when we unpack Honderich's argument, what we get is evidence not for ND, but for two theses that Honderich claims are incompatible with libertarianism. But the problem is that they are *not* incompatible with libertarianism. They are only incompatible with implausible *versions* of libertarianism that claim that we are free because we possess Cartesian minds (or something similar). The two theses are clearly *not* incompatible with NL; indeed, NL actually *entails* one of the theses (viz., "Neural events are the effects of standard causal sequences," i.e., of "prior neural or other bodily events") and *almost* entails the other (viz., "Mental and neural events are intimately connected – each specific type of mental event somehow necessarily occurs with a simultaneous specific type or types of neural event").[14]

A second objection one might raise against my claim that we have no empirical evidence for ND proceeds as follows. "You have made your argument seem stronger than it really is by zeroing in on the fact that ND is about *neural* events. But we really needn't concentrate on neural events at all, because determinists can make out their case at a much more general level – in particular, by providing empirical evidence for *macro-level determinism*, i.e., the view that all macro-level events are causally necessitated. More specifically, we can motivate this view with the following inductive argument: since all the macro-level events that we observe – e.g., billiard-ball events – are causally necessitated, we can rationally infer that *all* macro-level events are causally necessitated."

First of all, I would like to point out that all the arguments in Section 4 suggesting that ND is an "odd" view that lacks a precise, scientifically reputable formulation apply with equal force to macro-level determinism. But let me put this point to one side and respond to this inductive argument. The problem with this argument is that its main premise – the claim that all the macro-level events that we observe are causally necessitated – is *highly* controversial. There are many macro-level events that seem for all the world to be *not* causally necessitated. For instance, to use an example of Anscombe's, it seems that the event of falling ill with chicken pox is caused by exposure to

chicken pox but that it's *not* necessitated by it. Now, it is very obvious that determinists can *account* for this sort of phenomenon: they can simply claim that there are hidden variables within our bodies that determine which exposures cause illness and, more specifically, that anyone exposed to the disease *with the appropriate values for these variables* will – with certainty – fall ill. But the determinist's ability to *account* for apparently indeterministic phenomena is, in the present context, entirely irrelevant. The reason is that I am not trying to argue *against* determinism here. I am merely trying to block an argument in its *favor*. Thus, the question is not whether determinists can *account* for apparently indeterministic phenomena; it's whether they have an *argument* for their claim that such phenomena are, *in fact*, deterministic.

Perhaps an analogy will help make this point. Suppose I claim that all cats are black and try to argue for this inductively, inferring it from the claim that all the cats that we observe are black. And suppose that you respond that we have, in fact, observed many things which seem to be non-black cats. Will I accomplish anything by pointing out that I can *account* for this fact – e.g., by pointing out that it could be that everything that looks like a non-black cat is really a robot? Certainly not. What I need to provide is a *positive argument* for the claim that all apparent non-black cats are, *in fact*, *not* non-black cats – e.g., that they're robots. Likewise, determinists need to *argue* that macro-level events that seem to be undetermined – e.g., illnesses and human decisions – are, *in fact*, determined. Providing an account of how it *could be* that such events are determined does exactly *nothing* in the present context.

I take it that determinists have no response to this, i.e., that they don't have an argument of the required sort. The argument they *used* to give is that the apparently indeterministic behavior of macro-systems must really be deterministic, because such systems are made up of *micro*-systems whose behavior is deterministic. But as we've seen, this argument doesn't work, because micro-level determinism is currently less plausible than macro-level determinism.

So I maintain that we do not have any empirical evidence for ND (or for IR or NL, for that matter) and, indeed, that we aren't even close to having such evidence. All we have here is a deeply-ingrained dogma that determinism is true. We simply *assume* that all

events are causally necessitated. We assume that if we perform an experiment twice and get two different results, then the two physical systems on which we performed the experiments must have been in different states at the start of the experiments – that there must have been a *hidden* difference that we did not detect. But the fact of the matter is that we have no good reason to believe these things – they are simply dogmas.

VI. IS THERE *ANY* GOOD ARGUMENT AGAINST NL?

So far I have tried to defend libertarianism against the charge that it cannot be formulated in a clear, detailed, and scientifically reputable way. I would now like to argue that if the above considerations are right, then there are *no* good reasons to disbelieve NL. Briefly, my argument here proceeds as follows. According to the picture that I've given of the problem of free will, what we are working with here is a question about the *physical world*. In particular, it is a question about the way in which human brains evolve across time: whether we have free will (in the libertarian's sense) depends upon whether the brain-state shifts corresponding to our decisions are undetermined and non-random in an appropriate libertarian sort of way. The reason this is important is that it suggests that the problem of free will is an *empirical* problem and, hence, that *none* of the traditional *a priori* arguments on either side of the dispute are sound and, hence, that none of these arguments provides any good reason for doubting the truth of libertarianism.

Now, this last claim is a sweeping one, and the only way to really justify it would be to run through all of these arguments and *show* that they fail. I obviously can't do this here, but it is worth pointing out that from our current vantage point, the claim that none of these arguments succeeds in refuting libertarianism – and, indeed, that no *a priori* argument ever *could* do this – ought to seem extremely plausible. For (a) the only way for an *a priori* argument to refute a thesis about the physical world is to show that the thesis *couldn't possibly* be true, and the only way to do that is to uncover a *contradiction* in the thesis, or something like that; but (b) it's extremely difficult to believe that after all these years, we are going to discover a contradiction buried in the definition of libertarianism (or

determinism, for that matter). Therefore, it seems to me that the only way to argue against NL is to provide some sort of empirical evidence against it. But the arguments of Sections 4 and 5 are supposed to show that we don't *have* any such evidence. Therefore, it seems to me that we don't have *any* good argument against NL.

The situation here, it seems to me, is rather like the situation in 5000 B.C. regarding the problem of explaining the phenomenon of lightening: our question is about the physical world – in particular, brains – and so it ought to be answered with empirical rather than philosophical methods; but we aren't ready to answer the question empirically, because it's simply too *hard*.[15]

VII. THE SUPERIORITY OF NL

I haven't argued in *favor* of NL. I've only tried to show that there are no good arguments *against* it (or in favor of its competitors). Now, given that I maintain that we are presently too ignorant about the mind/brain to decide between NL, ND, and IR, it might seem that I would maintain that there simply *are* no good arguments in favor of NL. Depending on what you count as an *argument*, this may or may not be right. But let me at least say this: regardless of whether we have any *arguments* here, we do have some very strong intuitions, arising from introspection, that support libertarianism. Now, in the face of certain arguments *against* libertarianism, many people have been willing to write these intuitions off as illusory. But if I'm right that none of these arguments succeed, then our intuitions ought to carry some weight.

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NOTES

[1] I do not mean to suggest that I am the first person to defend a version of libertarianism of this general sort. In recent years, there have been numerous

philosophers who have defended materialistic (i.e., non-Cartesian) versions of libertarianism – see, e.g., Kane (1985), Nozick (1981), van Inwagen (1983), and Wiggins (1973) – and I suppose that some of them would probably accept my formulation of the view in terms of (1) and the negation of (3). But what is novel in this paper is the "libertarian stance" that I adopt in connection with the notion of appropriate non-randomness and the charge that libertarianism is not scientifically reputable.

[2] See Bohm (1952). It's not entirely accurate to say that Bohm has given an *interpretation* of quantum mechanics. It is more accurate to say that he has given an *alternative theory* to quantum mechanics.

[3] This part of NL is not original; it has been defended by, among others, Anscombe (1971) and van Inwagen (1983).

[4] Of course, there are serious restrictions on the sorts of states that can appear on the list. In other words, most of the *logically* possible next brain states are physically *im*possible. E.g., it is pretty clear that it is not physically possible for Charlie's brain to spontaneously transform into a chicken brain. But the question of *which* states are physically (or, rather, neurologically) possible is a question for neuroscience.

[5] Some would object here on the grounds that necessity is built into the very *notion* of causation. It is fine with me if we agree to this definition of 'cause,' for in this case, NL-ists will simply claim that some (and maybe *all*) of the events that we *thought* were causes really *aren't* causes – they're events which bring on their effects without necessitating them. We might call them *nncauses* (where 'nncause' is pronounced just as 'cause' is). Now, I suppose that one might claim that the notion of a nncause is *incoherent*, but I don't see how that claim could be *motivated*.

[6] There are two different versions of this non-necessitating-cause variety of indeterminism: *partial indeterminism* (PI) holds that *some* physical causes are necessitating while *others* are not, whereas *universal indeterminism* (UI) holds that *no* physical causes are necessitating. NL-ists do not need to take a stand here; they can adopt a *neutral indeterminism*, which simply denies that all causes necessitate their effects and says no more.

But I would like to point out, as an aside, that UI seems more attractive than PI, because it provides a more *uniform* picture of nature. Now, one might worry that (a) UI can't account for the behavior of things like *billiard balls*, and (b) UI entails that all laws of nature are *statistical*. But (a) it might be that cases involving things like billiard balls are simply cases where the differences in the effects from one situation to the next are undetectable to human perception. And (b) UI does *not* entail that all laws are statistical; it allows for universal causal laws, because such laws can have levels of imprecision that are greater than or equal to the amount of indeterminism in the causal relations of nature. For instance, suppose that A-events always cause B-events but that they cause different *kinds* of B-events – e.g., B_1-events, B_2-events, and B_3-events – and that which kind of B-event is caused by a given A-event is indeterministic. Then 'All A-events cause B-events' will be a universal causal law of nature, even though no A-event ever necessitates a B-event.

[7] Of course, a decision might involve more than two brain states, but for the sake of simplicity, I will ignore this complication.

[8] Many philosophers seem to think that a true and complete neuro-cognitive

science would leave the question of free will open. I think this is wrong. Indeed, it seems to me that if a true and complete neuro-cognitive science *did* leave the question open, then there simply wouldn't be any fact of the matter as to whether or not we are free. But that's the topic of another paper.

[9] While it is clear that no one has solved this problem, there *has* been some important work done that relates to this project. For example, Kane (see, e.g., his 1985) and van Inwagen (see, e.g., his 1983) have produced some important work that is relevant to the question of how our decisions could be *ours*, and *free*, and at least partially *rational* (i.e., not totally random), given that they're not necessitated by our reasons for action. But neither of these philosophers explains how our decisions could be ours, or free, or rational, or non-random, given that they supervene on neural events and, hence, that they arise out of the ordinary (indeterministic) movings about of sub-atomic particles.

[10] See Wiggins (1973); Kane (1985), preface; and Nozick (1981), p. 291.

[11] This is not to say that libertarians shouldn't be working on this project at all. On the contrary, I think they *should*. Moreover, as I remarked in footnote 9, I think that there has been some good work done by libertarians which is at least somewhat relevant to this project and which goes a long way towards blocking certain *other* worries about libertarianism, most notably, certain *a priori* worries about the *intelligibility* of the view. My claim here is simply that libertarians shouldn't grant to their opponents that until this project is completed, or almost completed, their view is somehow dubious, or less plausible than ND or IR.

[12] Considerations like these suggest not just that ND receives no support from current scientific theory but also that universal determinism receives no support from that quarter.

[13] This way of stating the point is van Inwagen's; see his (1983), p. 197.

[14] See p. 288 of Honderich (1988) for the first thesis, and p. 269 for the second. I say that NL *almost* entails the second thesis, because while it entails that mental events and their corresponding brain events are intimately connected, it leaves open the question of whether there's a necessary link here of the sort that Honderich describes.

[15] Unfortunately, this seems to be rather *typical*: metaphysics is chock full of problems that are just *very difficult empirical problems* – problems that only the most presumptuous would attempt to solve via pure reason.

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Department of Philosophy
California State University, Los Angeles
Los Angeles, CA 90032
USA