INTERVIEW BY ANDRES LOMENA CANTOS *ABOUT HOW PHYSICS MAKES US FREE*

ANDRÉS LOMEÑA: My first question is not surprising. Was this interview predestined to be real? I mean, I have freely chosen to contact you, but I am not entirely free because your book showed up in Sean Carroll´s Facebook timeline. That was not my decision! Is physics about "positive" or "negative" freedom? Is physics about "external" or "internal" freedom?

JENANN ISMAEL: It depends what you mean by 'pre-destined'. I know that is a typical philosopher's response. People sometimes hate that philosophers never give you a straight answer, and instead, begin immediately analyzing the meanings of words. Sometimes they are right to complain, but in this case, everything really hinges on the meanings. There are different senses of pre-destination and different senses of freedom. Physics rules out some and allows others, and I expend some effort in the book emphasizing the ways in which the future is **not** predestined and the senses in which we **are** free, even in a deterministic regime. Indeed, in my view, if we look at the positive conceptions of autonomy and freedom that philosophers who work on things like moral responsibility and autonomy and self-governance have developed, determinism is compatible with all of the ones that we should care about.

Of course, it is an open question whether physics is deterministic, but since determinism is most often thought to be the source of the scientific threat to human freedom, in the book, I stay mostly within a deterministic regime. The idea is to show what kind of freedom is possible within the relatively well-understood confines of classical physics.

The kinds of positive freedom that I suggest that one finds in that setting is that it allows for the emergence of creatures who regulate the impact of the environment on their behavior and do so according to ends of their own choice. It allows for creatures who are not passively imprinted by the environment, but collect information over the course of their history, picking and choosing and learning from and reflecting on their experiences, fashioning the materials provided by their experience into a set of values and goals and hopes and dreams (into a conception of who they are and what they want to be) in something like the way that a writer fashions a set of events into a story, or a sculpture fashions her stone into a statue. And it is the collection of this self-fashioned information that the human being brings to bear in making her choices. This kind of freedom is entirely compatible with determinism. It gives us a kind of control over who we are and what we choose that is quite close to what common sense supposes. This kind of freedom is the product of psychological sophistication. Instead of hard-wiring programmed responses to stimuli, Mother Nature provides the human being with a psychological platform that allows it to 'grow a self'. There are two important parts to the kind of freedom that I emphasize: (i) that the self exercise a kind of creative role in its own formation, and (ii) that the self exercises pivotal control over its behavior. ('pivotal control' here means that you can fix the external state of the environment of a person and not fix their behavior, because the behavior depends on their decisions)

The 'will', as the terms is often used in this setting, is just the practical arm of the self, so to speak. It is the mental faculty that makes decisions and exercises motor control over the body. I argue that you have freedom of the will, in the sense of ultimate and inalienable control over what you decide, but of course, there are external limitations on what you can bring about by will. You can flap your arms, and sing a song, and cook dinner for your loved ones if you decide to. You can also try to be good, and gentle and kind with others. You cannot, however, make yourself fly or jump higher than the empire state building by simply willing it so. Our physical powers are limited by the laws of physics. But the laws of physics give us control over the voluntary movements of our bodies.

If I understand your terminology, I would characterize this as a positive sense of internal freedom over our own wills, combined with an external freedom over the features of our own behavior that are controlled by the will.

A.L.: Sartre said that we are condemned to be free. Spinoza thought that free will is just a delusion while Kant argued that there is no proof for free will, but we have to act as if we were free. Where can we locate physics? I would say the second option (actually free will does not exist), but you point out that physics "makes us" free. I´m not sure if we are just confusing terms and there are no three options at all. I appreciate your effort in the book for not using useless jargon and for clarifying terms.

J.I.: I agree that part of the difficulty is confusion of terms. Words like 'freedom' appear nowhere in physics, so before we can see whether physics is incompatible with freedom, we have to say something about what freedom is. I don't think that we have a clear and distinct pre-theoretical notion of what freedom (or free will) is. The man on the street has a sense that how his life goes is – in some substantial and important sense – 'up to him', and a vivid sense when he makes his choices, there is nothing writ into the fabric of the world that forces his hand, or decides the case in advance. He thinks that it is **he** that makes his choice and that it happens nowhere else than in the **here and now**. Presented with the spectre of deterministic laws it is not clear how these pre-theoretical convictions could be anything but illusions. I think that a part of the positive challenge is to articulate a sense in which this is correct, and remains in place even in a deterministic setting. The task of reconciliation is showing how these pre-theoretical convictions can be correct, and that demands an examination of the relationship between laws, and time, and the causal order.
In saying that 'physics makes us free', I mean a number of things. I mean that physics makes us the kinds of things we are. Physics makes us human beings and human beings have the capacity for the kind of freedom that I described. But I also meant that it makes us free in the sense that it doesn't give us the option of being leaves blowing in the wind, flowers growing in a field, or planets orbiting a sun. The human body – if it moves – moves in part under its own volition. And that means that - like it or not – we have to make decisions. It means that we have not just the *capacity*, but the *burden* of literally, deciding our own fates. This is not to minimize that there are many ways in which human freedom is constrained by practical, psychological and political exigencies; ways in which our decisions, or the practical capacity to execute them are limited by the circumstances of our lives. But within those constraints, we decide who to be and how to behave.
There are some people how try to live passively, relinquishing control of their lives to the people or forces in their surroundings, but that itself is a choice.

A.L.: What do you think about possible worlds theory? Possible worlds are very different between David Lewis´s ideas and Hugh Everett´s proposal. Anyway, all perspectives suggest that we can imagine different pathways to our everyday lives like in the movie *Mr. Nobody* (2009). Daniel Dennett would probably reject that framework. If I am truly free, I need to realize that I have some "possibilities", some pathways, and that leads me to the beginning of the question: theory of possible worlds.

J.I.: Possible worlds in philosophy, I tend to think of as picturesque ways of representing possibilities. I'm not a believer in David Lewis style universe of disconnected closed concrete worlds. In this sense of possible worlds, I certainly think that it is correct to say that at any point in their lives (or along their world-lines), human beings have many possible futures, and that which of them will be realized is not fixed independently of their will, or by anything that is in place before they make their decisions.
In the context of an Everett style Multiverse, possible worlds aren't literally closed universes, but concrete parts of our universe. Whether there are such things is an empirical question, and one that is separable from the issues that I discuss about human freedom.

A.L.: Do you believe in the possibility of Laplace´s demon? What is your argument in favor of or against it[1]? I would say that Laplace´s demon is impossible. My absurd explanation is that we cannot make an "intelligence" like Laplace´s demon (a supercomputer, for instance) because we would need a total reflexivity in order to understand the whole world (a computer would need to calculate "the external world" and also "itself"). Popular culture always falls in simple trascendence (movies like *Powder, Trascendence or Lucy*).

J.I.: I'm not sure what you mean in saying that popular culture always falls in simple transcendance, so I will address the first part of your question about LaPlace's demon. In my book I use a rather odd and beautiful argument due to Michael Scriven to show that a LaPlacean demon who knew the laws of the world and the initial conditions could nevertheless fail to accurately predict the behavior of a device that was operating according to a counterpredictive mechanism, if the demon was required to reveal its prediction to the device. Your first thought might be that such devices cannot exist in a deterministic setting, but in fact, they are not only demonstrably compatible with determinism, but almost trivial to construct.
I still feel like it's a puzzling thing that I didn't fully get to the bottom of in the book, in part, because I was using it there to make a case for the compatibility of determinism with a causal order in which you have the positive freedom to refute anybody – even a Laplacean intelligence who knew everything they could possibly know, including the physical laws – by thumbing your nose at them if they told you what you would do a minute into the future. But I think that you are right that reflexivity is an important part of the explanation, in computational terms, of why such an intelligence wouldn't be able to succeed in its prediction.

A.L.: I have been reading *Spooky action at a distance* by George Musser. It seems that nonlocality is still fascinating. As far as I know, EPR paradox (and quantum entanglement) implies that Heisenberg principle is wrong or theory of relativity is wrong. We are here again with tricky concepts: indeterminacy in Copenhagen interpretation of quantum mechanics and determinism in relativity and classical physics. I feel in a new dichotomy again. How can we figure it out?

J.I.: Great question. Another one of the big difficult beautiful problems we face in trying to sort out what the world is like and how we fit into it. I think George's book is terrific. I don't think that it will be solved without transformative insights, and I hope that I live to see them when they come.

A.L.: Any conclusion?

J.I.: Only that physics doesn't threaten human freedom. The fact that we are part of the law-governed fabric of nature should not lead us to think that we don't have control over our own fates. It's a lesson that compatibilists like Dan Dennett and have been pressing for years, that if we really want to understand human freedom, we should focus on the notions of autonomy and self-governance, and self-constitution. We should stop hankering after some metaphysically inflated ability to act from **outside** the causal order and see the ways in which our position **in** the causal order gives us creative control over who we are and what we do. We should stop worrying about the imagined threat to freedom from physics, and focus on all of the ways – both substantial and mundane - in which human freedom is undermined political, social, and psychological factors. If I add anything to Dennett's discussion, it is a closer focus on

1 https://en.wikipedia.org/wiki/Laplace's_demon#Arguments_against_Laplace.27s_demon

the physical underpinnings. I think that there are lessons about the nature of physical law, causation, and time in physics that can be fruitfully extracted from thinking about how human agency fits into the natural order.

YOURS FAITHFULLY,

ANDRÉS.