

Are We Still Afraid of Science?

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Abstract In my paper, I do not follow the well-known story of how Husserl wanted to solve the crisis of mankind by his transcendental phenomenology. Neither do I analyse Heidegger's views on the danger of science and technology. Rather, I examine a new book by renowned physicist Stephen Hawking and his colleague Leonard Mlodinow, to see how they reflect on this situation today. Although I accept their method of a "model-dependent realism", I cannot agree with their arrogant formulation of a purely deterministic physical concept of the universe, and I strongly refute their conviction that human beings are merely deterministic robots without free will.

Keywords Hawking • Grand design • Multiverse theory • Brain • Free will • Quantum fluctuation

About 80 years ago, Edmund Husserl began to formulate his ideas about the situation in the world after World War I and the world economic crisis that led to the transfer of political power to the hands of irrational, nationalistic dictatorships. After all, he thought, this was the result of a fatal development in modern science: the split between the world of modern science and the naive world of human life had caused a loss of faith in human reason, giving way to irrationalism of all kinds. His unfinished book, *The Crisis of European Sciences and Transcendental Phenomenology*, appeared only after World War II (Husserl 1970).¹

In 1936, Husserl's pupil Jan Patočka published, in Prague, the first detailed description of the naive world of life from the phenomenological point of view (Patočka 2008 [1936]). At the beginning of his book Patočka formulates, quite dramatically, the feeling of the time: "Modern man has no unified world-view. He lives in a double world, at once in his own naturally given environment and in a

¹German edition: *Die Krisis der europäischen Wissenschaften und die transzendente Phänomenologie* (Husserl 1954).

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world created for him by modern natural science, based on the principle of mathematical laws governing nature. The disunion that has thus pervaded the whole of human life is the true source of our present spiritual crisis” (Patočka 2008 [1936]) – “What had hitherto been deemed reality is real no longer...” (Patočka 2008 [1936]) – “Since [man] does not live out of himself – rather life is something he *receives* – the question of the *overall meaning* of life lacks all real significance; [...] The lowered sense of self carries with it [...] a spreading of the objective barrenness into our very lived-experience. It is as if all the diversity of life were ringing with an unvaried tone of indifferent nothingness...” (Patočka 2008 [1936]: 137).²

I will not follow here the well-known story of how Husserl wanted to solve the crisis through his transcendental phenomenology. Neither will I analyse how Heidegger radically modified Husserl’s position by introducing the ontological topic of human existence and formulating his views on the danger of science and technology. I shall also not refer to how Patočka treated this problem in his *Heretical Essays in the Philosophy of History*, his last book, in the 1970s (Patočka 1996).³

Rather, I will look at a new book by renowned physicist Stephen Hawking and his colleague Leonard Mlodinow, to see how they reflect on this situation today (see Hawking and Mlodinow 2010). In short, I would not have believed that a position like this is still possible in the present day – but indeed it is. In their book, they solemnly announce that the “M-theory [multiverse-theory] is the only candidate for a complete theory of the universe [...] If the theory is confirmed by observation, it will be the successful conclusion of a search going back more than 3,000 years”. Though the sentence is introduced by a condition, the tone of the whole book is so self-assertive that when the authors declare in the last sentence: “We will have found the grand design”, the reader is inclined to believe that it is a done thing; because a few lines above, the authors are proud to declare, not in the conditional tense but in the indicative, that: “The fact that we human beings – who are ourselves mere collections of fundamental particles of nature – have been able to come this close to an understanding of the laws governing us and our universe is a great triumph”. And we are not to forget that their theory provides “a model of a universe that creates itself” (Hawking and Mlodinow 2010: 181).

What Edmund Husserl, the founding father of phenomenology, was afraid of is once again fully fledged here. Hawking and Mlodinow speak proudly about the achievements of “human beings” in physics – but what, in fact, are these beings, according to them? “[M]ere collections of fundamental particles” (Hawking and Mlodinow 2010: 181). We are even given an emphatic lesson explaining that we human beings, because we are “mere collections of fundamental particles”, cannot have free will (Hawking and Mlodinow 2010: 30–33). The naturalisation of the spirit, as Husserl called it, is here again clearly and explicitly declared.

If these particles – likewise all of nature – are governed by laws, and these laws do not admit any exception, they must also govern our behaviour and actions. All

² Translation: Erika Abrams.

³ Czech edition: *Kacířské Eseje o Filosofii Dějin* (Patočka 2007).

that we do and think is therefore quite unequivocally determined by the law of causality. The only trouble is that the particles we are made of are so many that we are not able to calculate the causal chains resulting in our deeds. So the naive illusion of 'free will' is still used as a plausible, 'effective' model, although we know how it 'really' is.

To support the possibility that life and intelligence can come into being as a result of deterministic processes, an example is described that in fact does not prove anything. It is the so-called "Game of Life, invented in 1970 by a young mathematician at Cambridge named John Conway" (Hawking and Mlodinow 2010: 172). A few logical rules govern the lighting up and switching off of squares on a square matrix; it is possible to view how the patterns made by the lit squares change and move as if the patterns were alive. But this would not be enough: to have a model of life, there must be a replication because, as Hawking and Mlodinow say: "One can define living beings as complex systems of limited size that are stable and that reproduce themselves." Nevertheless, to fulfil this condition is not beyond our scope: "One estimate, based on the earlier work of mathematician John von Neumann, places the minimum size of a self-replicating pattern in the Game of Life at ten trillion squares – roughly the number of molecules in a single human cell." Well, this is the first step – life can be a deterministic process. The next step is as follows: "Such an object would respond to environmental stimuli, and hence appear to make decisions." But now the trouble comes. This being will behave fairly intelligently, but the authors have no tools to decide, "would such life be aware of itself? Would it be self-conscious?". They of course know that a positive answer to this question is the condition for such a being to have free will. But "how can one tell if a being has free will? If one encounters an alien, how can one tell if it is just a robot or it has a mind of its own?" A robot is deterministic: it does not have free will. But "since an alien the size of a human would contain about a thousand trillion trillion particles, even if the alien were a robot, it would be impossible to solve the equations and predict what it would do". From this we are provided with the solution to the question of free will: since "it would be impossible to solve the equations and predict what it would do" the authors submit a substitute explanation. "We would therefore have to say that any complex being has free will – not as a fundamental feature, but as an effective theory, an admission of our inability to do the calculations that would enable us to predict its actions" (Hawking and Mlodinow 2010: 178). Free will turns out to be a pleasing label describing super-complicated, deterministic mechanisms.

But where does the authors' fierce effort to deprive people of free will come from? Why deprive people of the basic feeling of freedom and responsibility for their acts by forcing them to regard themselves as mere deterministic machines? It appears the authors believe that the only alternative to their theory according to which "the universe can create itself from nothing" (Hawking and Mlodinow 2010: 180) is that our universe was created by God. Their concept competes with "religious" education that suggests "this grand design is the work of some grand designer. In the US, because the Constitution prohibits the teaching of religion in schools, that type of idea is called intelligent design, with the unstated but implied

understanding that the designer is God” (Hawking and Mlodinow 2010: 164). “That,” as they continue, “is not the answer of modern science.” Modern science must do without God. “Many people through the ages have attributed to God the beauty and complexity of nature that in their time seemed to have no scientific explanation. But just as Darwin and Wallace explained how the apparently miraculous design of living forms could appear without intervention by a supreme being, the multiverse concept can explain the fine-tuning of physical law without the need for a benevolent creator who made the universe for our benefit” (Hawking and Mlodinow 2010: 165). Our authors pretend to be enlighteners; fighters against superstition, and also against philosophy – as they declare on the very first page of the book. They ask a number of questions that, as they themselves state, “traditionally are questions for philosophy. . .”. But as philosophy today, according to them, does not fulfil its task, they must continue by saying: “. . .but philosophy is dead. [. . .] Philosophy has not kept up with modern developments in science, particularly physics. [. . .] Scientists have become the bearers of the torch of discovery in our quest for knowledge” (Hawking and Mlodinow 2010: 5).

Let us take a closer look at what these questions are, given that “the purpose of this book is to give the answers”; at what the answers are “that are suggested by recent discoveries and theoretical advances” (Hawking and Mlodinow 2010: 5). The aspirations of the book are really not minor. The book starts in a similar way to Aristotle’s *Metaphysics*: “. . .humans are a curious species. We wonder, we seek answers.”⁴ Similarly, in the next sentence, the authors do not miss the opportunity to allude to Kant: “. . .gazing at the immense heavens above, people have always asked a multitude of questions. . .” (Hawking and Mlodinow 2010: 5). We can only wonder why they do not continue in Kant’s line of questioning and ask about the ‘moral law in ourselves’.

“How can we understand the world in which we find ourselves?” (Hawking and Mlodinow 2010: 5). Really, it is a fair philosophical question. But the authors do not mean the question in a transcendental sense. They do not ask what it means that we understand, or inquire into the structure of understanding or the conditions for us to understand anything. They simply ask for a non-contradictory theory that will cover all that ‘is’.

But perhaps this philosophical topic will be treated in the next question: “What is the nature of reality?” (Hawking and Mlodinow 2010: 5) Here, again, it seems we are in the womb of Aristotle’s metaphysics. Is it not he who asked “*Ti to on, touto esti tis hē ousia?*”;⁵ and established the concepts we have used more or less in the same meaning until the present day; as matter, form, essence, accident, and so on? But also here, we are disappointed. The book does not investigate how far our ontological concepts must be changed in comparison with those of Aristotle, to be able to handle the things we are speaking about in nuclear and sub-nuclear physics.

⁴“All men by nature desire to know” (Aristotle 1941: I, 1, 980 a 921).

⁵“. . .what is being, i.e. what is substance?” (Aristotle 1941: VII, 1, 1028 b 1024).

A similar story unfolds with the question, “Why is there something rather than nothing?” (Hawking and Mlodinow 2010: 10). Leibniz’s well-known, basic, metaphysical question⁶ is answered in an odd way that completely misses his intended, metaphysical meaning: “Spontaneous creation is the reason there is something rather than nothing, why the universe exists, why we exist” (Hawking and Mlodinow 2010: 180).

But again, the authors feel there is some problem with reality. They solve it for themselves as follows:

The naive view of reality is not compatible with modern physics. [...] We shall adopt an approach that we call model-dependent realism. It is based on the idea that our brains interpret the input from our sensory organs by making a model of the world. When such a model is successful at explaining events, we tend to attribute to it . . . the quality of reality or absolute truth. But there may be different ways in which one could model the same physical situation, with each employing different fundamental elements and concepts. If two such physical theories or models accurately predict the same events, one cannot be said to be more real than the other; rather, we are free to use whichever model is most convenient. (Hawking and Mlodinow 2010: 7)

In reading these lines, we can see several important points. First of all, what does it mean that “our brains interpret the input from our sensory organs”? Is there not abundant philosophical literature discussing this question? Does it not show that the question here is extremely complicated and cannot be answered without treating the human being as a whole; not splitting it into body and soul as was done in the Cartesian tradition, but analysing the structure of human understanding as rooted in a very special ontological structure that forces us to contrast human beings, not only against non-living things, but even against all other living beings, by considering its existential character? Only on the basis of such description – which began in Husserlian phenomenology of various kinds and has been carried on in what we can call Heideggerian phenomenology – is it possible to show how the building of scientific theories is rooted in exactly the “naive view of reality” that begins the quotation above: in, so to speak, the life of the finite, mortal human being; with our intrinsic understanding of the necessity to care for our own survival, and orientating ourselves by managing our possibilities.

There are originally no facts, no observations, no ‘events’ as they are meant in the above quotation. The basic life of human beings is stretched towards these possibilities, and only in managing them do we reflect on things like the differences between up and down, right and left, front and back, near and far, and, last but not least, future and past.

This ‘living in possibilities’ goes hand in hand with the development of what we call language; and only by means of speech is it possible to fix individual things and facts, to make distinct observations, and to quarrel about truth. Only now, having speech, is it possible to discover mathematics, the only ‘model’ of ‘absolute truth’; and hand in hand with this, the question arises of what it means to *be*: the

⁶“*Pourquoi il y a plutôt quelque chose que rien?*”; “Why is there something rather than nothing?” (Leibniz 1934 [1714]: §7, 26).

philosophical question of reality. Only in this situation can the germs of science – the theoretical thinking about nature – begin.

It was a major philosophical struggle to get rid of metaphysics, which wanted to acquire definitive knowledge of everything; and to reach the discovery that all our concepts are historically biased and that it is meaningless to hope for ultimate metaphysical answers. This move in philosophical thought has been accompanied by a new understanding of the historically inherited concept of human freedom. Human being is now understood in terms of our being “thrown” into being, into existence, without having anything absolute to lean upon when deciding what to do; when looking for the ultimate meaning of life. Even gods of all kinds have disappeared in this epoch and do not function as warrants of the absolute. Human freedom is nothing less than this; and free will is simply a special part of it. It is a special task for us to describe this new situation thoroughly and to mark out the new possibilities of life on our human level. This is what Jan Patočka started to think about in his late essays, during the 1970s (Patočka 1996).

What Hawking and Mlodinow call “model-dependent realism” can only appear and be understood in the historical situation just described; when there are no gods and no hope for reaching anything absolute. This methodological position is certainly acceptable: indeed, it is clear that “there is no picture- or theory-independent concept of reality” (Hawking and Mlodinow 2010: 42), and that “physical theory is a model and a set of rules that connect the elements of the model to observations” (Hawking and Mlodinow 2010: 43). It is obvious that “if two such physical theories or models accurately predict the same events, one cannot be said to be more real than the other; rather, we are free to use whichever model is most convenient” (Hawking and Mlodinow 2010: 7). Yet, is it not interesting that even the authors themselves, who are advocating the impossibility of free will, ‘are free to use whichever model is most convenient’?

Of course they are free. They freely design the theories and models – and this means in fact the laws – of nature. But human freedom is finite. We have to design, or prescribe (to speak with Kant) the laws of nature so that nature can obey them. And we are also free to obey the laws we have invented, or to not obey them and die. To understand that there are no omnipotent gods also means to understand that even if we are free, we are not gods and we have to respect our finitude. Our finitude – the impossibility of disobeying the laws of nature – is one of the main conditions for the possibility of our reasoning: the condition that forces us to understand. The other condition is, of course, that which we call ‘the regularity of nature’; that it is not governed by Descartes’ *deus malignus*, which would like to deceive us. In the end it seems that these two conditions – human, finite freedom and the regularity of nature’s behaviour – are one and the same. Perhaps Kant meant something similar when articulating his deduction of categories in the *Critique of Pure Reason*.

Now, what does it mean that we freely choose to use whichever model is most convenient? Apparently it is most convenient for us to calculate and accurately predict events we are interested in. In this sense a model is real: it really does give us the power to use the regularities of nature for our goals. Considered from this point of view, this is, of course, a great achievement.

But what has been achieved from the point of view of explanation? When we are doing scientific experiments, we are observing phenomena within our ‘naive view of reality’. We see the changing position of the pointer on the apparatus, we see the change of colour of something, see that something appears, that something disappears. Now, using historically inherited language, we ‘make models’: we freely invent ‘theories’ about what happens beyond our sight through metaphor, which fixes structures of the observed happenings and allows us to formulate them mathematically. So we speak about particles, forces, fields, waves, beams and strings; and also about time and space. In this sense it is quite acceptable that the mathematical descriptions of these structures work with multidimensional and non-Euclidean spaces; that time is another dimension of space, and so on.

The trouble begins when we evasively forget the metaphorical character of these words; forget that they are just the names of arguments in mathematical equations; and start to use them speciously in ‘normal’ language – as is done in the book we are speaking about. For what else is it when the authors insist that they have shown how our universe began out of nothing, as one of a multitude of others, and even state the exact time when its beginning occurred? A frosty shiver runs down the spine and in bewilderment we remember Shakespeare’s *King Lear*, shouting in passion to his loving daughter: “Nothing will come of nothing!” (Shakespeare 1975: Act I, 1).

However, when we look closer at the formulations used to communicate this ‘information’, we see that it was not quite ‘out of nothing’. In the introductory chapter we read that “these multiple universes arise from physical law” (Hawking and Mlodinow 2010: 9); and at the end of the book we learn of a “spontaneous quantum creation of the universe” (Hawking and Mlodinow 2010: 136). On the next page, in a more exact formulation, “nothing” appears again: “quantum fluctuations lead to the creation of tiny universes out of nothing” (Hawking and Mlodinow 2010: 137).

Of course, we are not so bold as to try to imagine something like this. We would like only to understand the thought pattern that makes such an idea possible. And it is obviously simple: “Some people make a great mystery of this idea, sometimes called the multiverse concept, but these are just different expressions of the Feynman sum over histories” (Hawking and Mlodinow 2010: 136).

Although the authors inform us in a general way about Feynman’s theory, which was invented for the description of the paradoxical wave and corpuscular behaviour of micro-particles, they do not give us any grounds for why they can retell this highly abstract mathematical model so shamelessly for a naive audience, using the traditional concepts of time, space, creation, beginning and – last but not least – nothing:

Over the centuries many, including Aristotle, believed that the universe must have always existed in order to avoid the issue of how it was set up. Others believed the universe had a beginning, and used it as an argument for the existence of God. The realization that time behaves like space presents a new alternative. It removes the age-old objection to the universe having a beginning, but also means that the beginning of the universe was governed by the laws of science and doesn’t need to be set in motion by some god. (Hawking and Mlodinow 2010: 135)

So, in the end, we hear echoes of the fairytale about the clever peasant girl who came to the palace to become the King's wife, because she was the only one to fulfil the King's conditions: she came neither naked nor dressed, neither on foot nor on the back of an animal, and so on. On the one hand, the beginning of our universe happened 'out of nothing', being 'governed by the laws of science'; on the other hand, there is no beginning of the universe because time behaved 'at that time' as a dimension of space.

Given all this, I think, one can no longer be surprised that in the variety of such spontaneously beginning universes there is one so fine-tuned that such ephemeral beings as humans could arise there. But let us see the conclusion of the authors:

Only a very few (universes) would allow creatures like us to exist. Thus our presence selects out from this vast array only those universes that are compatible with our existence. Although we are puny and insignificant on the scale of the cosmos, this makes us in a sense the lords of creation. (Hawking and Mlodinow 2010: 9)

Is what we hear at the end of the quote a mere fluke, or should we understand that the dream of the old Descartes that we be "*maîtres et possesseurs de la nature*" has become reality?

And what about our leading question? Are we still afraid of science? I think not. It seems to me that people have got so used to scientists' careless handling of the metaphors taken from the 'naive world' that they do not take it as seriously as they did some 100 years ago. What we have to be afraid of is what Martin Heidegger, especially, analyses in his late works: namely, that we assume a godlike sovereignty – which makes us think we are lords of creation, commanding the power of all possible universes – and forget that we cannot even master the powers we have really acquired.

But how could we, if we are willing to hold ourselves as part of these acquired powers; and if even renowned scientists try to convince us that we are merely deterministic robots without free will? – So, in the end, we are to be afraid of these irresponsible scientists; who in their limitless pride proclaim nonsense which even they themselves cannot believe – unless they are, in accord with their theory, robots arisen as a result of some not-quite-successful quantum fluctuation.

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