

Hans-Dieter MUTSCHLER\*

## Is Materialism a Consequence of Natural Science?<sup>1</sup>

### Summary

Naturalism is neither a consequence nor a presupposition of natural science in a threefold way: (1) the principle of matter, (2) the principle of supervenience and (3) the principle of the causal closure of the world are *metaphysical* principles. They are true, if naturalism is true. So, if you are a naturalist, you should find reasons for your worldview which are independent from natural science. But it is hard to see how this could work.

**Key words:** the principle of matter — the principle of supervenience — the principle of the causal closure of the world

If you think of naturalism you immediately think of the naturalization of human beings. You think of what has been called the ‘hard problem’ of naturalization, which means the naturalization of

---

<sup>1</sup> This article constitutes an excerpt from my book: Mutschler, *Halbierte Wirklichkeit*, (2014). Permission granted to Wydawnictwo Ignatianum: Hans-Dieter Mutschler, *Halbierte Wirklichkeit. Warum der Materialismus die Welt nicht erklärt* © 2014 Butzon & Bercker GmbH, Kevelaer, [www.bube.de](http://www.bube.de)

the so-called 'qualia.' But this is not the only problem of naturalization. You could also think of intentionality, normativity, freedom, morality, reason or mental causation and so on.

Naturalism comes in different versions. *Scientific* naturalism is the claim that everything in this world can be explained with the help of physics, chemistry and biology *only*. This sort of naturalism is very common in the mind-brain debate and it is our concern here. But there is also another sort of naturalism, according to which naturalism is not restricted to the natural sciences but can make use of all empirical sciences, psychology, sociology and history as well. This sort of naturalism is only opposed to what they call the 'supernatural,' which is excluded. Then there is a third sort of naturalism, which takes as its starting point biology only and extrapolates this doctrine to whatever human beings do and think. The so-called 'memes' of Richard Dawkins are a good example for this sort of naturalism.<sup>2</sup> There are perhaps other sorts of naturalism, but let's restrict ourselves to scientific naturalism, which dominates the mind-brain debate.

In this regard critics of this kind of naturalism often treat the *results* of this sort of reductionism and try to show that reductionism does not really explain what should be explained. But let's go a step backwards and ask a more fundamental question, one which is seldom asked: Is naturalism a consequence of natural science?

Every naturalist will answer this question in the affirmative, but we will see that this is not so easy.

To begin with: there have been very famous scientists who were *no* naturalists, like for instance the physicists Max Planck, Albert Einstein, Werner Heisenberg or Erwin Schrödinger. The same is true for biologists like Theodosius Dobzhansky or Francisco Ayala. Ayala is even a Catholic priest. How could this be the case if naturalism was a consequence of natural science? If this was true it would be also possible to be at the same time an astrologer and an astrophysicist.

---

<sup>2</sup> Cf. Dawkins, *Das egoistische Gen*; Dawkins, *Der blinde Uhrmacher*.

This never occurs. But there are even scientists who are trained in both theology *and* natural science like John Polkinghorne, Ian Barbour or Arthur Peacocke. How can this happen if naturalism is a consequence of natural science? By the way, we will speak of ‘naturalism’ and ‘materialism’ promiscue, because from an ontological viewpoint, both mean the same. But let’s go on in a more systematic way.

I claim that modern naturalism relies on three dogmatic principles:

- (1) The principle of matter.
- (2) The supervenience principle.
- (3) The principle of the causal closure of the world.

All of these three principles are necessary for the naturalist and naturalists will insist that all these principles can either be derived from natural science or they might be necessary presuppositions.

It is not astonishing that we have exactly these three principles, because they form a whole: the principle (1) of matter is the basis of everything. For the materialist it is something like the “*fundamentum inconcussum*” of Descartes. The principle (2) describes the statics of the universe, while principle (3) describes its dynamic. So they form a whole.

On the other hand, you cannot deny a single one of them, without losing sight of naturalism altogether: if you deny principle (1), naturalism has no ontological basis. Materialists put it often like this: everything is composed of atoms and there is nothing over and above this basic stuff. If you deny principle (2), higher levels of organisation are no longer totally dependent on the material basis. Life or consciousness for instance where something is “over and above” the atoms. If you deny principle (3), causal influences of the spirit become possible, either of the human spirit or of the spirit of God. In this case something like agent causality becomes possible.

So all three principles must be true, *if* modern scientific materialism has to be true. But why should modern scientific materialism be true?

In the subject literature, you will seldom find good reasons for these three principles, because everybody believes, that they are true altogether and that somebody who denies them must be a religious fundamentalist or a neovitalist. But we will see that this is not the case. You can deny these principles on very good grounds.

Let's go on step by step in order to show that all of these three principles do not follow on from natural science. In fact they are *meta-physical* principles. Modern materialism is a sort of metaphysics and has nothing to do with empirical science whatsoever.

### (1) The principle of matter

It is uncontested that physics refers to matter; at least to certain properties of matter. But properties rely on underlying substances and it is altogether unclear what these underlying substances are.

This puzzle becomes clearer if we think of the mathematical form of physical knowledge: we describe this knowledge by mathematical functions which are nothing but relations, but what are the underlying relates? Take for instance the simple formula of special relativity, everybody learns at school: energy equals mass times the speed of light to the square ( $E = mc^2$ ). Here you have a relation between energy and mass. But what are mass or energy *in themselves*? You don't know. The same is true for quantum field theory for instance. In quantum field theory a particle is nothing but an n-place relation. It has nothing to do with Democritian substances, as was often believed until today. By the way: there is not a single formula in physics where the notion 'matter' ever occurs!

Many philosophers or even scientists think that matter is nothing but mass, which is a parameter that occurs all the time in physics. But this cannot be true either: if matter equals mass, then photons

or fields are something spiritual, because they no longer belong to the material world, which is absurd. In fact, *everything* that belongs to physics, energy, entropy, mass, fields and so on, belongs to physics and you cannot single out a certain property and identify it with what you call 'matter.'

So I think that the notion of 'matter' does not belong to physics at all. It is part of our practical worldview. We all know what matter is. It is a part of our everyday life. We could call it 'folk physics,' if we insist in the fact that 'folk physics' is a general presupposition of scientific physics and cannot be overcome by science. Every science is rooted in what Edmund Husserl called 'life world' ('Lebenswelt').

Some physicists tried to reduce all physical entities to a singular one. Wilhelm von Ostwald, for instance, tried to develop an energy ontology, while Einstein himself believed in a field ontology and Carl-Friedrich von Weizsäcker developed an information ontology. But this does not work either. If all physical entities are only relational, you will not find one of them as a substance for the rest. This is why all these ontologies never succeeded.

## (2) The Supervenience Principle

The supervenience principle had its origins in philosophical ethics in order to treat the question as to whether moral values are determined by natural values. Then it was Donald Davidson, who introduced the supervenience principle into the mind-brain debate.<sup>3</sup>

This principle means that in the case of two levels of organisation the lower level determines the higher level while the contrary must not be true. The modal force of the determination can vary: examples for strong supervenience are nomological or logical supervenience, an example of weak supervenience is, for instance, factual supervenience.

---

<sup>3</sup> Cf. Davidson, *Handlung und Ereignis*, pp. 291–317.

nience. So the basis determines the superstructure, but not the other way round. That is what we call the 'principle of multiple realizability' which often holds in computer science, because one and the same sort of software runs on totally different sorts of hardware.

The supervenience principle is a metaphysical principle. It cannot be derived from empirical science. This is clear from the outset. No principle, that refers to the totality of things or events can ever be justified by empirical science. On the other hand, it cannot be a necessary presupposition for empirical science. In physics, for instance, there are many systems without different levels of organisation. So the supervenience principle cannot be applied.

In the subject literature they constantly mention the following example, which is indeed an example of strong supervenience: the molecules of a gas determine, according to Ludwig Boltzmann, what we call the 'pressure' and 'temperature' of the gas. This is true, but there are many cases where the supervenience principle does not hold, even if you have more than one level of organisation.

If you have for instance two entangled systems in quantum theory, the state of the whole system does not supervene upon the two entangled systems separately. Or: in biology the structure and behaviour of organisms does not supervene upon the genes, something that becomes clear in systems biology. Cells are often able to switch the genes on and out. So we have a sort of downward causation, which contradicts the supervenience principle. Or: the function of pheromones (which means messenger molecules) does not supervene upon the chemical structure of those pheromones. The function of such pheromones depends on the organism as a whole. The same is true for exaptations. Properties which have been created by evolution for a certain purpose can be used by nature for a totally different purpose.<sup>4</sup> Purposes never supervene upon means. This is also true for human actions. We can always make use of the same means to different purposes, even at the same time.

---

<sup>4</sup> Cf. Gould & Vrba, Exaptation.

It is the analytic philosopher Jaegwon Kim who dealt most with questions of supervenience. In his books on this topic, you will *never* find a single natural scientist mentioned.<sup>5</sup> Otherwise he would have noticed that natural science is not in favour of the supervenience principle.

### (3) The causal closure of the world

This principle means: if you have a state of the world  $W_1$ , then this state is sufficient to produce the next state  $W_2$  a state of the world  $W_1$ , then this state is sufficient to produce the next state  $W_2$ . So the world is a closed chain of causes and effects. No spiritual causes can influence the world which is causally closed in itself. An independent agent causality does not exist.

Here too we have the same situation as with the supervenience principle: the principle of the causal closure of the world refers to the totality of existing things and is as such a *metaphysical*, not an empirical principle. Moreover, it can be rejected on empirical reasons: there is a problem with Einstein's special relativity. According to this theory simultaneity does not exist for the whole universe. But this is presupposed if a state of the world  $W_1$  should be sufficient to produce the next state  $W_2$ .

There are some more reasons why we should reject this principle: like the principle of matter is not part of theoretical physics, 'cause' and 'effect' do not occur in this science. This is why Bertrand Russell rejected the principle of causality altogether a 100 years ago. If you read the literature on this topic, you will find that every scholar has a different opinion on causality or no opinion at all<sup>6</sup>. But how can we know that the world is causally closed, if we do not know what causal-

---

<sup>5</sup> Cf. Kim, *Supervenience and mind*; Kim, *Supervenience*.

<sup>6</sup> Michael Esfeld is one of the best philosophers of physics. In his anthology on this topic (Esfeld, *Philosophie der Physik*) most of the contributors avoid the notion of 'causality' and the notion of 'matter' does not occur anywhere.

ity is and if this notion is not part of the most fundamental doctrine i.e., of physics?

It seems that Russell was right for the following reason. Let's take the same example from above:  $E = mc^2$ . Most of the insights of theoretical physics have this form of equation. Equations are symmetrical. If  $E = mc^2$  then for the same reason  $m = E/c^2$ . The equation works in both directions. But this is not true for cause and effect. If  $c$  is the cause of  $E$ , then  $E$  is *never* the cause of  $c$ .

Many philosophers think that a cause must be energetically powered to produce its effect. But this does not seem reasonable. Take for instance the planets moving round the sun. Why do they remain on their elliptical curves? Why do they not fly away? It is because of the conservation of the angular momentum; that they remain. But this has nothing to do with an energetic input on the planets.

Everybody agrees that cause comes first and then the effect. Many physical laws do not depend on the parameter of time. This is another reason why they cannot be interpreted causally. A way out seems to be thermodynamics. Here we have an arrow of time, pointing in the direction of an increase of entropy. But if you have a hot cup of coffee and it becomes cold, you will never say that the coffee being hot is the cause for it being cold afterwards. This means that the arrow of time is only a necessary condition for causality, not a sufficient one.

But independently of physics, many questions concerning cause and effect are totally unclear. What are the relates of the causal relation? States, events, facts, things, persons? What is the nature of the relation? Does it depend on deterministic or statistical laws? Do forms of singular causation exist and so on?

If you think of statistical laws like in quantum physics, in medicine or in psychology, the principle of the causal closure immediately becomes lost, because then the effect is no longer necessitated by the cause, but the cause only increases the probability of the effect.



There are philosophers like Peter Strawson and Georg von Wright<sup>7</sup> who believe that the origin of cause and effect lies in human actions (this resembles the origin of the notion of ‘matter’). If this is the case, the principle of the causal closure of the world breaks down, because we do not know any natural laws of human actions.

Perhaps the naturalist will answer: causality is not the result of natural science, but a necessary presupposition. If you do not take this principle for granted, natural science becomes impossible. This is true, but the meaning of this principle is not ontological in kind, it is an *epistemic* principle, something like a norm of scientific investigation: if you have a material effect, you *should* search for a sufficient material cause. But from the ‘should’ the ‘is’ does not follow.

### Consequences

If what has been said is true what are the consequences? First of all, if ‘matter’ is not a scientific notion, a materialistic worldview is not scientific either. Second, if the same holds for the notion of ‘cause’ and ‘effect,’ the mind-brain debate changes dramatically.

It was the philosopher Peter Bieri who invented three principles, only two of which are logically compatible. In most textbooks concerning the mind-brain debate, these three principles are quoted at the beginning:

- 1) Mental and physical events are different in kind;
- 2) Mental events are causally efficient;
- 3) The physical world is causally closed.<sup>8</sup>

This is the starting point of most of the textbooks concerning the mind-brain debate. Then usually it goes on like this: since only two of these principles are logically compatible, you must first choose the

---

<sup>7</sup> Cf. Strawson, *Analyse und Metaphysik*; von Wright, *Causality and determinism*.

<sup>8</sup> Cf. Bieri, *Analytische Philosophie des Geistes*, p. 5.

one which is most important. This it seems, is principle 3), because it is necessarily linked with natural science. Then you have the choice between 2) and 3). You will choose principle 2), because our social life depends on the truth of this principle. So you must drop principle 1): mind and matter are not different from an ontological viewpoint. So it follows (or seems to follow), that materialism is the only reasonable choice.

But if what has been said is true then principle 3) is only an epistemic principle, not an ontological one. In this case you must make no choice: all of these three principles are easily compatible and materialism is no longer without an alternative. But the question as to how this alternative looks, is not easily answered. If materialistic monism is false, it does not follow that substance dualism is true. Perhaps a weaker sort of dualism like aspect dualism will also do the job. It might be advisable to come back to Aristotle!

### Streszczenie

Naturalizm nie jest ani konsekwencją, ani założeniem nauk przyrodniczych z trzech powodów: (1) zasady materii, (2) zasady superwencji i (3) zasady przyczynowego domknięcia świata, które są zasadami metafizycznymi. Są one prawdziwe, jeśli naturalizm jest prawdziwy. Tak więc, jeśli jesteś przyrodnikiem, powinieneś znaleźć przesłanki leżące u podstaw twojego światopoglądu. A to jest trudne zadanie.

**Słowa kluczowe:** zasada materii – zasada superwencji – zasada przyczynowego domknięcia świata

### Literature

Bieri, P., [ed.] *Analytische Philosophie des Geistes*, Bodenheim: Athenäum Hain Hanstein, 1993.

Davidson, D., *Handlung und Ereignis*, Frankfurt am Main: Suhrkamp, 1990.

- Dawkins, R., *Das egoistische Gen*, [Trans. by] K. de Sousa Ferreira, Berlin, Heidelberg, New York: Springer-Verlag, 1978.
- Dawkins, R., *Der blinde Uhrmacher. Ein Plädoyer für den Darwinismus*, [Trans. by] K. de Sousa Ferreira, München: Kindler Verlag, 1987.
- Esfeld, M., [ed.] *Philosophie der Physik*, Frankfurt am Main: Suhrkamp, 2012.
- Gould, S. J. & E. S. Vrba, *Exaptation — a missing term in the science of form*. *Paleobiology* 8/1 (1982), pp. 4–15, URL: [https://faculty.insead.edu/vibhagaba/documents/Gould%20%26%20Vrba\\_Exaptation.pdf](https://faculty.insead.edu/vibhagaba/documents/Gould%20%26%20Vrba_Exaptation.pdf) (visited on 08/27/2012).
- Kim, J., [ed.] *Supervenience*, Trowbridge, Wiltshire: The Cromwell Press, 2002.
- Kim, J., *Supervenience and mind. Selected philosophical essays*, Cambridge: Cambridge University Press, 1993.
- Mutschler, H.-D., *Halbierte Wirklichkeit. Warum der Materialismus die Welt nicht erklärt*, Kevelaer: Butzon & Bercker, 2014.
- Strawson, P. F., *Analyse und Metaphysik. Eine Einführung in die Philosophie*, [Trans. by] C. Hochkeppel, München: Deutscher Taschenbuch Verlag, 1994.
- von Wright, G. H., *Causality and determinism*, New York, London: Columbia University Press, 1974.