Metaphysical Problems of Physics
Lecture 1 (13. Apr 2021)
Introduction

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2 Metaphysics

So, what is metaphysics, anyway? It's just this thing, ya know?

That, at any rate, appears to be the attitude of many contemporary philosophers who nominate themselves 'metaphysicians', but never define their own subject matter.[1] Perhaps we, then, can say a bit more about it than that. Metaphysics—from the ancient Greek 'τά μετὰ τά φύσικα', literally "the things after the physical things", or, a bit more broadly, "what comes after or lies beyond or stands in the midst of physics"—is the study of the nature of the world.[2] It subsumes ontology—the study of what exists, and, more broadly, what it means to exist—and includes as well the study of the properties and behaviors of and relations among what exists, and, on some construals, the same for entities that do not exist in any standard sense. Archetypical topics include causality, laws of nature, possibility and necessity, identity, natural kinds, and the nature of space, time and (more recently) spacetime. Clearly, these issues pertain to those studied by contemporary physics. But how? What is the relationship between physics and metaphysics? How can or do or ought they bear on each other?

It is worth attending to the words of one who would not nominate himself 'metaphysician' and would not consider himself a physicist, but who nonetheless has made deep contributions to both fields and given the matter at hand serious thought—Howard Stein. In his "How Does Physics Bear Upon Metaphysics; and Why Did Plato Hold that Philosophy Cannot Be Written Down?" (p. 6, the version on my website, Stein's emphases), he says:

> Now to physics and metaphysics. Aristotle—who did not use the *noun* 'metaphysics'—offers us (at least) three *formulas*: "the science"—or *is* it a science?—"of being as such" (not perhaps very illuminating); or "of first principles and causes"; or "of the substance with the highest kind of actuality"—in which connection he also calls it "theology." But one must be careful to try to understand what Aristotle means by this. The substance in question, eternal and unchanging, unmoving, because it is entirely "actual" and in no way "potential," Aristotle associates with the heavens and their (allegedly) unchanging regular motions. It is not the substance *of* the heavens—the substance of the heavens is a kind of *body*; and although its motions are stable, they are yet *motions*. The divine substance is, rather, the constantly actual, never changing, *cause* of the regular motions of the heavenly bodies. Thus what Aristotle calls "theology" may be seen as his version—a little remote, to be sure—of what we should rather call "astrophysics." He even tells us (vi.1.1026a28–31) that, since first philosophy is to deal with the most fundamental causes, if there were no such substance, "separated" from matter, from

1. To be fair, most physicists do not bother to define 'physics' either—which is one reason among many to love Maxwell.

2. There is a story—possibly apocryphal, but, dear god, do I hope it is true—that the medieval Latin 'metaphysica' derived from an accident of librarianship. The work by Aristotle now bearing the name was not so-called by him. (Indeed, he never even used a word lexically akin to 'metaphysics'.) It had no canonical name, being, in the estimation of most scholars today, a collection of otherwise independent essays on loosely related topics collocated by philosophers following Aristotle. On the shelves of the Library of Alexandria, having nowhere else to put this chimeric congeries, the librarian placed it physically after the book by Aristotle it seemed to have most in common with, his *Physics*, or, in ancient Greek, 'τά φύσικα'. Thus τά μετὰ τά φύσικα—that collection of scrolls placed in the spot following τά φύσικα.

> potentiality, and *therefore* unchanging, as, he argues, there is, then natural science—physics—would be the primary and highest philosophy.
>
> Before I put a Q.E.D., claiming to have proved out of the mouth of its first author that, in view of modern ideas about the world, physics is not merely relevant to, but *is* what used to be called "metaphysics," I shall indulge in yet another pair of quotations; this time from a (fairly) modern physicist with a mind charged with Socratic skepticism and a wonderful prose style[, *viz.*, James Clerk Maxwell].

(The subsequent quotations are from Maxwell 1878 and Maxwell 1879, both suggested readings for next week's lecture.)

Starting from the positivism of Comte and Mach and the empiricism of Mill in the 19th Century, the idea that metaphysics just *is* physics (buttressed, perhaps, by some sturdy formal logic) became a popular view for much of the 20th Century, championed (in more sophisticated forms, to be sure) by, *inter alia*, Bertrand Russell, the young Wittgenstein, and Carnap and many of the Logical Empiricists.

The worm has now turned. Since Quine bamboozled philosophers—who were, it must be said, all too willing to be led into temptation, and even sin—into believing that there could be no principled distinction between empirical matters of fact and matters that seem to reach below or above or beyond the empirical, they have thrown themselves into the modern study of Analytic Metaphysics with Corybantic abandon. Rational introspection (*a.k.a.*, "what makes me feel good when I think it") can be shown no less a legitimate method for arriving at knowledge as scientific investigation.

At the same time, science in general, and physics in particular, anathematized philosophy. The era of the great physicist-philosophers, culminating with such luminaries as Poincaré, Planck, Einstein, Bohr, Schrödinger and Heisenberg, came to an end, and physics got on with the practical business of describing, predicting, manipulating and controlling.

I find both of those attitudes unsatisfying—and, I am happy to say, I am not alone in this today, among both physicists and philosophers. There is more to physics than describing and predicting, and less to metaphysics than the fanciful flights of pure thought. The two disciplines do—can, should—make substantive and mutually beneficial contact with each other. We shall try to figure out what that may come to, and how it may happen, at least to some small degree.

You will find, nonetheless, that—not so much that my overt sympathies lie with the physicists as that my overt antipathies are laid against the metaphysicians.

3 Anti-Metaphysic Philippics

aphorisms

A metaphysician: one who says "it *must* be so"—and thinks he means something by it.

Another metaphysician: one who says "it *cannot* be so"—and does not doubt her doubt.

The Principle of Sufficient Reason: "When something happens to catch my eye, I will

by god find something to say about it that will suffice to glut my interest in it."

One can come to metaphysics by any of a number of virtuous routes: cowardice, avarice, sloth, arrogance, lust, envy, gluttony. (Why Christians are metaphysicians.)

A metaphysician: one who will argue (and believe) that the claim "nothing is something" is meaningful and true, but "something is nothing" is not.

"I can think of no other way it can be; therefore, it must be that way." A metaphysical argument.

We are surprised when the world—in its structure, in its relations, in its motion—its state and its evolution—does not mirror our words. As though our words came first.

The mind rebels—but the world is apolitical.

The politics of the mind lie beneath the world's notice.

4 Metaphysics and Physics

aphorisms

The less we try to find meaning in a thing, the more deeply we may understand it. (The world is a thing.)

Quine was wrong. Math and logic are put-up jobs; science is not. The world slaps science down like the upstart it is when it doesn't behave. The world couldn't give a piss against the wall about math and logic. (Insight into Quine's psychology.)

Most conclusions don't last. The observations that spur one to them, they are everything.

There is more than one kind of knowledge, and more than one frutiful way of trying to understand, to get a grip on, the world. (Against epistemic chauvinists of all kinds, including those of science.)

epigraphs

To hell with metaphysics.

Jeremy Butterfield
(public lecture ca. July 2014, extemporaneous exclamation)

[L]a metafísica es una rama de la literatura fantástica.

Jorge Luis Borges
"Tlön, Uqbar, Orbis Tertius"

[M]etaphysics is a subject much more curious than useful, the knowledge of which, like that of a sunken reef, serves chiefly to enable us to keep clear of it...

Charles Sanders Pierce
"How to Make Our Ideas Clear"

[W]e are met as cultivators of mathematics and physics. In our daily work we are led up to questions the same in kind with those of metaphysics; and we approach them, not trusting to the native penetrating power of our own minds, but trained by a long-continued adjustment of our modes of thought to the facts of external nature.

James Clerk Maxwell
"Address to the Mathematical and Physical Sections of the British Association"

[W]e must bear in mind that the scientific or science-producing value of the efforts made to answer these old standing questions is not to be measured by the prospect they afford us of ultimately obtaining a solution, but by their effect in stimulating men to a thorough investigation of nature. To propose a scientific question presupposes scientific knowledge, and the questions which exercise men's minds in the present state of science may very likely be such that a little more knowledge would shew us that no answer is possible. The scientific value of the question, How do bodies act on one another at a distance? is to be found in the stimulus it has given to investigations into the properties of the intervening medium.

James Clerk Maxwell
"Attraction"

When science starts to be interpretive
it is more unscientific even than mysticism.

D. H. Lawrence
"Self-Protection"

Ahhh, it's so hard, ya' know, it's so hard to believe in anything anymore, ya' know what I mean? It's like religion, you can't really take it seriously, because it seems so mythological and it seems so arbitrary, and then on the other hand, science is just pure empiricism, and by virtue of its method it excludes metaphysics. And I guess I wouldn't believe in anything if it weren't for my Lucky Astrology Mood-Watch.

Steve Martin
"A Wild and Crazy Guy"

5 Themes of the Course

1. metaphysicians err when they formulate problems with no attempt to ascertain whether relevant physical theories admit them as 'natural', and when they attempt to address problems with constructs confabulated *in vacuo*, out of touch with the needs and contraints of the epistemic content of our best physical theories

2. similarly, physicists—most especially those who work at the edges of, and even beyond, the ambit of empirically entrenched knowledge—err when they work in willful denial of the need to ensure that their concepts be clear and fruitful, their principles cogent and justified, their epistemic foundations secure

3. an enlightened and sophisticated pragmatism—in the rich sense of Peirce, as regimented by James, brought down to Earth by Dewey, informed by the rarefied spirit of logic by Carnap, opened up to possibility by Putnam, made wise and contemplative by Stein, in continual conversation with physics—that's the ticket

> Thus the view is expressed [in Plato's Seventh Letter] that the whole apparatus of what we might call "object-semantics," involving both linguistic signs and ordinary things (Plato's "images"), cannot suffice to determine meaning and truth, without some essential involvement of the *language users* and their *conceptions and beliefs*; and the writer goes on to assert that this determination can occur reliably only in *discussion*, with questioning and answering "free from envy"—and that, indeed, over a long time: a process which, in favorable conditions, can lead to a shining forth of the light of understanding and intelligence (φρόνησις and νοῦς).
>
> Howard Stein
> "How Does Physics Bear Upon Metaphysics; and Why Did
> Plato Hold that Philosophy Cannot Be Written Down?"

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Stein, Howard. 1995. "How Does Physics Bear Upon Metaphysics; and Why Did Plato Hold that Philosophy Cannot Be Written Down?" *Studies in History and Philosophy of Modern Physics* 72 (): 152–161. Published in 2020. The paper was delivered by Stein as a talk at a faculty colloquium (an informal affair) of the Department of Philosophy at the University of Chicago in November 1995. A scan of Stein's original typed manuscript can be found at <http://strangebeautiful.com/other-texts/stein-physics-and-metaphysics-original.pdf>, doi:10.1016/j.shpsb.2020.06.004.