# Re: Things we take for granted

***Source:*** http://sci.tech−archive.net/Archive/sci.physics.relativity/2004−08/1649.html

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***From:*** Patrick Reany (*reany_at_asu.edu*)
***Date:*** 08/07/04

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ueb <Ulrich.Bruchholz@t−online.de> wrote in message news:<k4u0fc.s5.ln@Muse2.private.de>...
*> Patrick Reany wrote:*
*> > ueb wrote in message news:<u74uec.t5.ln@Muse2.private.de>...*
*> >> Patrick Reany wrote:*
*> [snip]*
*> >> > Anyway, I ask another strange question: Why does physics use the*
*> >> > variables it uses (such as length, time, mass, and charge) rather than*
*> >> > use other variables for the description of physical events?*
*> >>*
*> >> Do "physical events" not mean the combination of these variables ?*
*> >> What variables would you propose ?*
*>*
*> > First, I'm using the term "physical events" in the sense of physical*
*> > values at spacetime points.*
*>*
*> Clear.*
*>*
*> > These events include field values and*
*> > boolean variables such as "electron−here," "quark−here,"*
*> > "photon−here," "mass continuum−here," etc. Obviously I'm referring to*
*> > "physical" attributes in the purely theoretical sense, as the boolean*
*> > variables are indicating the "theoretical objects" freely created by*
*> > humans to make theories that work.*
*>*
*> Your famous slogan. :):):)*

I may have made it famous here, but the phrase has appeared elsewhere. Maybe it's original with me but I doubt that. The sentiment of my epigram is central to the instrumentalist position of pragmatism and free invention. It is, of course, very simplistic and some people like to mischaracterize my philosophy as simplistic. But one needs something as a sound bite.

The central issue that instrumentalism has against the realist view is their claim that the purpose of science is to find out deep reality. Now, I have views of deep reality (in my own natural philosophy) and I don't care that other people have their own beliefs about deep reality. I just insist that science is NOT the right tool to prove

what deep reality is all about. I have a principle which few people have, and I don't break it. The principle is that whatever we should define science to be, it should be about what it can PROVE it can accomplish. Science CAN prove that it has theories that work. It can't prove that even a single one of them is True. In fact, as I have argued may times, it is meaningless to say that any explanation of natural events is true. A theory is an explanation in the form of a deductive system. As far as I'm concerned there is NOTHING in the natural world which is a deductive system. So, it is meaningless to me to say that an explanation or deductive system is true of Nature. The universe does not need and did not ask for human−invented explanations.

I think there may be a misconception that instrumentalism is nothing more than an apolgetic for modern physics. As far as I'm concerned, science was never able to justify realism and shame on it for ever thinking it could. Does the earth really orbit the sun, or is it the other way around? The instrumentalist answer is, "Who cares? Choose the simplest theory and be done with the worrying about the Truth of it."

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The instrumentalist viewpoint is argued at:

http://www.eblaforum.org/main/viewtopic.php?t=276

A question that comes up often is whether or not science aims at true (or truthlike) theories. Alternatives include the idea that all science requires are theories that "work", whether that means providing accurate predictions or something similar, or are "successful", which is again open to interpretation. Some people appear to argue that since no theory can ever be absolutely certain, it follows that science isn't really trying to find the truth but instead what works or theories that are successful: we shouldn't worry about truth and can instead get on with the business of science that works.

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The science we learn in school is the set of theories that work best. They
could be correct, or incorrect. They are the best we have. Some very basic
theories agree with more advanced theories. The basic ones can be called
the reasons for the others. Still, the reality is the reason for the science: the science is just a possible description of how reality works.
Science cannot tell us why reality happens to be as it is.

Dr. Ken Mellendorf
Illinois Central College
http://www.newton.dep.anl.gov/askasci/phy00/phy00316.htm
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Except that Mellendorf did not define "reality" for us. Apparently he is just as cavalier and as blind to the deepness of this concept as most posters here are. Science can't tell us HOW reality really works either. It can, however, invent theoretical decriptions that tells us what to expect of the behavior of "reality."

*> I'd agree that you can add such Boolean variables to the "events".*
*> What were the use ? Are you aware of the very different meaning*
*> of the examples called by you ? Thus, *free* electrons and photons*
*> really exist during quarks and the mass continuum do not and are*
*> indeed nothing else than having been freely created by humans.*

I don't give a damn what really exists for purposes of doing science. I care only about those concepts which really are instrumental for the invention of theories that work.

I care what really only within my personal natural philosophy.

*>*
*> > I propose no specific alternatives to those we use. I simply see no*
*> > compelling reason to believe that the variables we use are either True*
*> > of Nature or unique to human possibility. The fact that I can't think*
*> > of alternatives is not in itself proof that they don't "exist" in*
*> > theory land or in deep reality.*
*>*
*> The variables are indeed not unique to human possibility. But there*
*> are indeed variables which are "True of Nature", and fundamentally*
*> distinguish from the rest. All of them are in the Einstein−Maxwell*
*> equations.*

Did you know that Einstein was unsatified with the linear Maxwell equations?

*>*
*> > One obvious possible indication to the ability to find "new" variables*
*> > is through canonical transformations on variables in Hamiltonian*
*> > theory. The point I want to make here is that just because one could*
*> > generate a new set of variables by a canonical transformation doesn't*
*> > mean that the new set is "natural" for human use. But I'm not*
*> > restricting consideration to algorithmically generated new variables.*
*>*
*> Ok. There are lots of transformations, and just engineers use them.*
*> Mostly, a new (virtual) space is introduced, for example, functions of*
*> time are transformed to functions of frequency.*
*>*
*> >>*

*> >> > In other*
*> >> > words, are the variables we now use either true of the world or are*
*> >> > they inexplicably indispensible for doing physics correctly?*
*> >>*
*> >> Could you express yourself rather natural scientifically than*
*> >> philosophically ?*
*>*
*> > I can't. The issue here is philosophic not scientific. The question*
*> > is, Why consider these "strange questions" in the first place? It's to*
*> > determine the outer limits of possible human knowledge by knowing what*
*> > possible boundary conditions exist on human theories. Just how free*
*> > are we in the creation of human theories.*
*>*
*> We are free as we like. The question is what has it to do with*
*> nature.*

There are two very different answers to that question, depending on whether you're a realist or an instrumentalist. The instrumentalist insists that the only correct objective (well, really intersubjective) test of a theory against nature is the limited realm of human observation and instrument readings. The realist, however, insists that some intuition about what is True of deep reality MUST be added onto that. Instrumentalists don't give so much trust in intuitions, not the least because they aren't universally held by people. Intuitions are subject to dogmatism, whim, and fashion, none of which give me any confidence as producers of Truth.

*>*
*> > Those who follow Truth have a very small set of possible models they*
*> > allow themselves to invent and use in the pursuit of Truth.*
*>*
*> Yes, indeed.*

What would happen if these followers of Truth do go astray from he path of Truth and don't realize it? If the path itself has been sanctified, it'll be a long time before the error is fixed. The real error is to sanctify the path in the first place.

*>*
*> > Those that*
*> > pursue theories that work have a much, much larger set of models they*
*> > allow themselves to invent.*
*>*
*> Indeed. Humble question: How do you notice whether and how such*
*> theory really works ?*

The degree of match between a theory's predictions and its experimental tests.

*>*
*> > Which belief system is more likely to*

> > *succeed in the end?*
>
> *The second "belief system" can present lots of fictitious successes.*

1) How do you know when a success is fictitious?
2) Why does it matter if a success is fictitious?

Why do you argue with success?

Patrick