

THE PROBLEM OF WHETHER REALITY IS REAL

Somehow, the laws of thought must be the laws of things if we are going to attempt a science of reality.

John Boodin (1916)

We see that we can never understand the true nature of reality.

James Jeans (1943)

The change in the concept of reality manifesting itself in quantum theory is not simply a continuation of the past; it seems to be a real break in the structure of modern science.

Werner Heisenberg (1958)

This moment here is the only observable time and place for us in our universe.

Frank Herbert (1976)

But on the Einsteinian interpretation [of SR] reality literally falls apart, and there is no one way the world is.

William Craig (2008)

We now know with relatively high confidence that it's the idea of reality which is at stake.

Anton Zeilinger (2008)

It's odd sitting here, wired into the Web, watching streetlights winking out while thinking of reality. I mean, from where I sit, Frank Fiction as I think of him is more real than Frank Fact. Even when he is away I feel he is still with me. And, though his speech is sharp at times, like me he seeks illumination. He may not be agreeable but in the end it seems we do agree.

Compare the at-best lack of interest, the at-worst barely-hidden boredom, that are now the standard fare from Real Frank. Even when he's here his butt soon leaves in search of softer parking, leaving an uninterrupted view. Outside the glass North Hollywood is taking on a jaundiced hue. The freeway's sound sounds just like surf but this illusion is disrupted when a semi starts to lose a tread. The question whether *anything* is real sometimes seems to me a real question. In a cloud of hesitation I clutch anything I can. The west-side window overlooks the realm of Universal City. My problem isn't that its version of reality is

fiction; it's that, as a MacDonald fictional detective says, 'It's got to the point where all that slop looks alike to me.'

The brotherhood of beach bums taught me there's a wide variety of views. I long knew the sisters have views too. And what is any world view but someone's reality that's just as real as my own? So now I'm working on the *real* reality? This notion is eroding my foundations like a backwash sucking sand. Sometimes my reality eludes me like an eel. Only when I do not try to grasp it does it still. Last night beach-bound I stop grasping. Moonlight fractures on the strangely silent sea. Dopesight tells me German genius embodies a Germanic view. What view? As I ask myself, an answer leaps to mind: Palmström's. A poet, Morgenstern, describes it. Palmström, struck by traffic, dies. He knows reality is right. As the weed recedes from me I wonder at his dying insight. Palmström is immersed in German language, German culture, German thought, the German sense of order. He knows that no traffic is permitted on this street. Thus he knows that he has *not* been struck. His dying thought is: '*Nicht sein kann, was nicht sein darf!*' It can't be, since it's not allowed. Heisenberg takes on new meaning in this light.

I'm a creature of the board and beach. My contact with reality is mainly through my feet. These days they do a shoddy job as, office-bound, I try to keep that contact while I get to know him. He seems to know me well enough. All I have to go on are his random comments and his cryptic questions. Each time his voice intrudes I try to figure what he really thinks. It's not easy. I recall Holmes says to Watson,

You remember ... when I read you the passage in one of Poe's sketches in which a close reasoner follows the unspoken thoughts of his companion, you were inclined to treat the matter as a mere *tour-de-force* of the author.

Holmes goes on to give a demonstration of his own. But Poe's close reasoner, Dupin, and Holmes can *see* their subjects there before their eyes. Or so their stories go. I am a blind batter waiting for a pitch that doesn't come. Trying to decipher him, I cannot even conjure up an image in my mind. It's in this condition that I have to figure how to walk our ex-cop through reality—a curious convention, as MacDonald says. Some never get a grip on it. Some *others*, I'd have said. Textbooks tell me it's a metaphysics problem: Outside of the mind, *is* all this real? And, if it is, what is it? And, if not, what is the mind?

So how do I define this for him? What I do when I'm in doubt about direction is dig blindly. Digging blindly somehow finds me Trevor. He is twelve. Trevor doesn't know he *has* a definition of reality. He just knows he has a real Olympic torch there in his hands. Everyone who sees him knows that he is right. *Physics* says they all are wrong. Not just wrong about what's real; wrong about what real is. One way to deal with this is dismiss physics: For most purposes one's no-

tions of reality are good enough to get one by from day to day. Another way is turn the tables: Does Trevor notice something physics manages to miss? Does everyone? Each person has their own reality, or thinks so. Few study what it really is. Fewer spend their lives in study: metaphysicists. But they too are wrong. How do I know? They don't share the same conclusion. Not even close. So, again, this leaves two options: All of them are wrong; or almost all are wrong and I don't know who's right.

Max Tegmark's a cosmologist. He focuses the metaphysics using this hypothesis: 'There exists an external physical reality completely independent of us humans.' So far this remains unproven. Thus for those who think it true it is an article of faith. Though there seems to be one thing about reality most physicists accept: They say that there is no objective present. In other words, the sense of 'now' and all that it contains—the very thing that most regard as their immediate reality—is subjective. A polite word for illusion.

This is a question of philosophy, not physics. Philosophy positions it in two main fields. One is concerned with what is. It's called ontology (from the Greek *ον*, pronounced 'on', from the verb 'to be'). The other is concerned with what we know. It's called epistemology. I think of the one as apropos reality and the other what we *think* about reality. Well, actually, when I think about it, which I do too often, they're about what we think is reality and what we think is what we think about reality. No wonder I flunked out. And though this distinction may have philosophical foundations, physics is now seized of it. *Sic transit gloria mundi*. By which I mean not papal-coronation ritual but Dickinson just poking fun: 'Such transcendental prospect, I ne'er beheld before!'

A purist might say physicists can only be concerned with what we know—epistemology. A quick google soon undoes the purist: ontology+physics gets what Google calls two million hits. It seems to me ontology must be the well whence physics takes its water but as I read on I find there seems to be a third divide (that's Will, not Stew) between ontology and epistemology, somehow muddled with the one between philosophy and physics. Each of these divides seems strange; in each the sides inform each other. Each pair is like a marriage that's forever torn. Surprisingly it's physicists who've taken to epistemology, abandoning what is to the philosophers. Einstein would turn in his grave—if he had one.

But, back firmly turned, physics, through its two great theories of our age, has nonetheless an impact on reality. Take QM. Until the early 1900s no one knows that it exists. Now it is embedded in the life of almost every person on the planet. I take a sample of ten physics papers from the arXiv site whose titles focus on reality. All ten are about QM. Yet QM is widely understood—an admittedly fallacious four-word phrase—as saying it is not about the real world. It's even said

to say reality is not a meaningful idea, that what we see as real exists because and only insofar as it's observed. So 'tis said but *is* it so? Well, as near as I can see the notion that there's no reality without measurements slightly overstates the Copenhagen view. Here's Heisenberg's authoritative—far from only—Copenhagen version of observing an electron:

Quite generally there is no way of describing what happens between two consecutive observations. It is of course tempting to say that the electron must have been somewhere between the two observations and that therefore the electron must have described some kind of path or orbit even if it may be impossible to know which path. This would be a reasonable argument in classical physics. But in quantum theory it would be a misuse of language which ... cannot be justified.

Well, yes, I did say slightly! And physicists get on with observations without worrying too much about what happens in between.

Others wonder. What—if anything—is real? My detective needs to get a handle on it. If QM's no help, does relativity say something? Well, it does but it is screwy. I pick up the thread in the late 1800s with the *Lorentz Transformation*. It is based on relativity. It fits the reality of one observer to the viewpoint of another who is moving in another way. It's named for Lorentz because Larmor is the first to publish it in 1897; Lorentz publishes it two years later; but in 1905 Poincaré names it after Lorentz and his label sticks. Larmor's losing out this way is par; Bryson laments that 'there are three stages in scientific discovery: first, people deny that it is true; then they deny that it is important; finally they credit the wrong person.' Bryson says that Humboldt said this. If so, it's ironic that its many repetitions on the Web all trace to Bryson, not to Humboldt.

The Lorentz Transformation is the inspiration for SR. But then Minkowski transforms SR into Spacetime. He takes care to fix his own name firmly to this concept. What's its virtue? Craig describes it:

While space measurements and time measurements when taken separately are relative, space-time measurements are absolute. The space-time position of events and the space-time interval between them are the same for all observers and never change.

I need a figure to show what Minkowski means. It needs four dimensions. That's hard because my screen has only two. With imagination one can fudge a 3-D picture onto 2-D paper. But four? The standard fix is to omit one space dimension. The best I've seen is done by Greene. His book is on my table. He has diagrams that slice up Spacetime like a loaf. They show how reality depends on how one's moving. And—even more disturbing—Spacetime says that the future is already in existence. Always was. Reality's a movie that's just waiting for the viewer.

I know Frank will not believe me. So I'll say to him: See Greene.

And then I'll tell him that reality's a simple matter after all: Each observer brings a different view. What they have in common is: All of them are right, says relativity. Or, says QM, all of them are wrong.

What is the Problem of Whether Reality Is Real? Well, simply: Is it? And what sort of physics is it that can only answer no? And how does all this help to pin down the Beginning of the universe? I give my head a shake and take it home.