

# ON BEGINNING

'Begin at the beginning', the King said, very gravely.

Lewis Carroll (1865)

I knew ... that his mind, like my own, was busy in endeavouring to frame some scheme into which all these strange and apparently disconnected episodes could be fitted.

Arthur Conan Doyle (1901)

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

John Boodin (1931)

Why is there anything at all?

Steven Weinberg (1992)

Everything important is, at bottom, utterly simple.

John Wheeler (1999)

The great thing about fiction is it's self-contained and so much simpler than reality. The power's off; it's dark; it's hot; my laptop battery is low. Reality. It knows no bounds.

The Beginning must be self-contained and simple too. But it is hard to find. Even more now than before, *his* problem's weighing on my mind. How is he to get to there from here? Hiding in my head he must be on the case. He's perfectly positioned; he will fathom it if anybody can. That moment when he says that maybe we can find it is for me a revelation. In that instant I believe it can be done. Looking back I see now how the dream has grown. All my life I've not *done* anything. Now I am determined to do this.

No voice since last night and so I fret: How do I get through to him? He doesn't seem to get this message though he does pick up on things I think. I case the scene. Recent data are the key. They unveil new ways of looking back in time. They hover ever closer to the moment when it all begins. But the meaning of the data hangs on theory and the theory falls apart at very early times. As they peer behind the Big Bang, physicists find shadows of whatever they assume.

The LHC makes pseudo-cosmic bangs in huge machines that analyze their hot debris. CERN says: 'Physicists will use the LHC to recreate the conditions just after the Big Bang.' He should ignore the way that this confuses Big Bang with beginning. The LHC is multi-billion-dollars' worth of just too late, a trillion trillion times too late to truly tell the tale of how the universe began. The LHC can-

not create conditions like Time Zero. The only way to get there is the Big Leap: Do not pass the Big Bang, go directly to Time Zero. It's the opposite of inching backwards, ever nearer, never getting to the goal.

Does he know this? Somehow I'm convinced he does. I sense him roaming, soaking up the cosmos, plucking clues from problems that beset cosmology today. The only way to the Beginning is a thought experiment on a vast scale. He must ask himself: To make *this*, how would I begin? A boundless question. It will need a wild insightful plunge. But he has lots of clues and there are concepts that could help. I've been working on this list for months.

First, it must be first; that is, it must be primal. It can't support the concept of *before*. For instance, it must have no space, since space leads to the question: Where did that come from? If it can't have space, it can't have length and breadth, which must depend on space to make them meaningful. And it can't have time, because even a tiny time leads one to ask with Augustine of Hippo: What happened before that? The Beginning must be, as Lemaitre says, 'the now without a yesterday.'

The Beginning cannot include anything that must depend on things it can't include. Sometime after the Beginning particles like quarks and photons and electrons must appear. I just think of them as Somethings. Today there are a million billion trillion trillion trillion trillion trillion Somethings, mostly photons. The Beginning had far fewer Somethings. He needs to ask: How many Somethings were there *then*? Seems to me the answer must be none. It must avoid all multiplicity so that, in Haas's words, it needs no further explanation.

Thus it must be simple. If it isn't simple, it cannot be the Beginning. I think of all this as the *Primal Principle*. If he thinks of a beginning that's not primal in this sense, it isn't the Beginning. So the Primal Principle could help him narrow down what it must be.

Second, the Beginning must include all that it needs to lead it to the universe we know. Lederman says the laws of nature must have existed before even time began in order for the beginning to happen. The cosmic egg must turn into the universal chicken. Thus the egg includes the chicken rules. Of course I think of this one as the *Chicken Principle*.

Third, the true Beginning should resolve the problems of cosmology. If it is right, then it's the universal axiom. It should make sense of all those senseless clues. This doesn't need a name; it's what detectives do.

So I would say to my detective—if I could—keep these in view: the Primal Principle, the Chicken Principle, and all the clues. This, I'd say, is how he should begin to look for the Beginning. Though this be madness, Shakespeare has Polonius explain, yet there is method in it. I reach for the spare coffee pot. It's

where I keep my stash when I'm in funds. An onshore evening breeze is breathing on the beach.