THE PROBLEM OF PARAMETERS

"I only know what it is that's wrong with him; not why it is."

"And what is it?" asked Lucy fearfully, expecting some harrowing tale.

"The old trouble; things won't fit."

"What things?"

"The things of the universe. It is quite true. They don't."

Edward Forster (1908)

Two of the biggest mysteries of modern science are then how these 35 or so parameters are determined.

Lee Smolin (2004)

Right now there are just way too many freely adjustable parameters in physics. Everybody agrees about that.

Tim Maudlin (2012)

Parameter's a bad word in the world of physics for good reason. Parameters are numbers I call fudge. Good physicists see more parameters as bad. Smolin says:

> Has physics reached an impasse, and what can we do about it? One source of the crisis is that many … theories have many freely adjustable parameters. As a result, some theories make no predictions at all.

With parameters it seems that more is less. Why then would each advance in physics manufacture more? How bad is it? Well, from what I read about it, really bad. Smolin—who *can* count to two—goes on to say that:

> The most popular theories, such as supersymmetry, have many more free parameters—the simplest supersymmetric extension of the Standard Model has 105 additional parameters. This means that the theory is unlikely to be tested in upcoming experiments.

Some of the 'upcoming experiments' will use that particle accelerator, the LHC, whose main reason for existence is to test these theories. If even *it* can't see if they work, what then is scientific truth? If it means no more than we believe it, what is science but a faddish faith, a secular religion, a one-word oxymoron—knowledge we don't really know?

Smolin's not the only one concerned that physics lost its compass in the

middle 1900s. Many worry that the new shut-up-and-calculate-the-next-parameter approach is losing touch with physics' roots. Its disciples are, according to the worrywarts, undercutting the foundations of the science revolution.

Maybe worry's warranted but this is not his problem. He is a detective; he does clues. His question re parameters is: Why so many of them? Were they there from the Beginning? He walks in without a coffee. It's a signal that he's not about to stay. I put the proposition to him. Boring. He doesn't say it but I see it in his eyes.

So I do not tell him John von Neumann's said to have said that he could fit an elephant with four parameters and wiggle its trunk if he could use five. Instead I wonder if my guy knows I am writing that the pros are saying fifty years of labor in the fields of physics have produced a harvest they did not expect: more parameters, not less. Is there a message in this mess? Few parameters is what is needed, all agree. Maybe it's that *Millinocket* thing again. Maybe he *can't* get there from here.