

## Preface

People have the wrong idea about science – not least scientists themselves. For the last few hundred years, a story has been doing the rounds to the effect that scientific discoveries are made by first formulating an hypothesis, then performing an experiment, and finally drawing a conclusion. The reality could hardly be more different. Some of the greatest discoveries – radioactivity, genetics, quantum theory – began with experiments whose outcome defied expectation. Others began with grand conclusions about how the universe is put together, with no clue about how to check it experimentally.

But many, perhaps even most, of the great discoveries in science began with a *question*. When Newton saw an apple fall to the ground in the garden of his mother's house (a story which Newton insisted was true), he asked himself how this could happen, and was duly rewarded by the discovery of the universal law of gravitation. When Einstein asked himself as a teenager what it would be like to ride upon a light-beam, his answer led directly to his Special Theory of Relativity,  $E = Mc^2$  and all that. The American physicist Richard Feynman claimed that his bafflement over the rate of wobble of a dinner plate spinning through the air in a cafeteria ultimately led him to Nobel Prize-winning discoveries about sub-atomic particles.

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Great minds, great discoveries – but, on the face of it, rather trivial questions. The thing is, Nature herself doesn't know the meaning of the word trivial. From the birth of a spiral galaxy to water gurgling down a plughole – all are manifestations of the primordial laws of physics. And time and again the history of science has shown that the key to understanding the universe often lies in asking a great question.

Over the last three years, I have had the privilege of being asked to investigate a host of wonderfully varied questions about life, the universe and everything by readers of the *Sunday Telegraph*. From the origin of blue moons to the origin of the universe, the causes of tides to the fate of odd socks, they have come my way in droves each week, my only regret being an inability to take on them all. Instead, I have had to be selective, choosing ones whose answers are little-known, counter-intuitive, or have rather deeper implications than one might expect.

This book represents a selection of the many hundreds of questions I have received over the years, whose answers I hope you will find especially entertaining and informative. Some deal with fundamental issues about the nature of reality and the limits to knowledge. Others deal with rather more run-of-the-mill matters – like how best to remove ice from your car wind-screen, and whether milk should go in before or after the tea.

Whether your taste is for the cosmic or the quotidian, what follows should convince you that the greatest myth of all is that science is merely what men in lab coats do for a living.

Robert Matthews