This is the re-edition of a piece written, originally, for the NRIG (Normal Realist Interest Group)

Normal Realism

The Modern Recipient of the Machian Legacy

Are there two realities? Nonsense, you might say. Yet in mainstream physics, since the days of Descartes, *via* Galileo, Newton and Einstein, there *have* been two realities. One is the reality of the normal, everyday perception of physical objects (*phenomena*) and the other is the reality of those objects as they are assumed to be 'really' in themselves, independently of all observation and detection.

Philosophers from Berkeley to Mach have had great trouble with this. How, they wondered, can we claim to *know* of the existence of things beyond all perception and knowledge if we never perceive them? The only answer seemed to be that although we cannot know what those objects are in themselves, God knows, absolutely, what they are in themselves, how they move among themselves, how they interact among themselves, how they endure in themselves, and so on in ways that it became the aim of theoretical physics to second-guess.

This 'God's-eye-view' approach to physics has been called 'Realism' which, in essence, is that space, time, mass and motion are *absolute*, so that all things endure at the same cosmical rate, according to which time − implicitly, God's time − is the same everywhere. So when it is twelve noon here by earth GMT, it is tacitly assumed to be twelve noon on all the planets, stars and galaxies throughout the universe by that same standard. And if any clocks vary according to that absolute standard, then there must be something wrong with them, so that they need to be adjusted and regulated to tick simultaneously all over.

Philosophers such as George Berkeley and Ernst Mach thought this absurd. For them, *time* was no problem. Far from being the ineffable mystery that some thinkers have made of it, in the same way that length is measured by instruments such as rulers, so time is measured by other instruments we call clocks. So, in our communal observer-frame we may design and construct mechanical clocks and regulate them to run synchronously with the movements of the heavens to create an arbitrary time-standard like GMT. But that does not mean that this same synchrony we contrive locally holds for all clocks and other time-processes among the stars and galaxies everywhere.

The realisation of this dependency on observation was the beginning of *relativity*. As Einstein demonstrated in his famous *Theory of Relativity*, time and space are not absolute but relative. That is to say, clocks and other processes recording time, such as heart-beats, cell-divisions and so on, as well as other biological and mechanical processes, both macroscopic and atomic, can be observed to vary relatively to the point of observation. These time-processes are known to vary with such things as temperature, chemical composition and other circumstances in general, so that there is practically no unique, or cosmic 'time-standard' that exists anywhere. This dispenses altogether with any notion of there being an ubiquitous 'God's time'. In particular, the Theory of Relativity has shown that these time-processes vary in proportion to large distances and fast motions measured in the observational reference-frame. The effect of this discovery on Physics has been profound. Indeed it has been hailed as a physics revolution on a par with the heliocentric theory of Copernicus and Galileo.

However, Einstein's Theory of Relativity has never caught-on in public perception to the extent which that earlier revolution did. Why is that? Relativity was first conceived by the physicist Mach and developed mathematically by his relativist protégé, Einstein. However, although he was popularly accredited with being the precursor of Einstein's famous Theory of Relativity, Mach rejected that claim. In a notorious Preface to his book *Prinzipien der physikalischen optik* (1921) he firmly disclaimed being a forerunner of Einsteinian relativity. In his view, it would prove, in the end, to have been no more than what he called 'a transitory inspiration in the history of science'. What Mach could not accept was Einstein's confusing mixture of relative and absolute, which has made Relativity so notoriously abstruse that it has become a veritable by-word for obscurity among the public in general. For instance, how can the defining properties of an object, such as its mass, length and duration, be 'relative to the observer' when the two are separated by perhaps aeons of time due to light having to travel between them *in vacuo*, at the 'finite and absolute speed' *c*, as Einstein's Relativity teaches? In Mach's scientific philosophy those two propositions could never be reconciled. In short, relativity and what is called 'Einstein separation' cannot truly live together in the rational mind.

The fact is, however, that the distance-time constant *c* is not necessarily interpreted in Einstein's separatist way as a 'velocity'. Just because all velocities are ratios of distance by time does not mean that all ratios of distance by time are velocities. To assume that this is so is therefore a logical fallacy. In embracing this fallacy, Einstein was merely following, uncritically, the separatist tradition of God's-eye view Realism in Physics. That separatism had been introduced into nascent Physics in the seventeenth century in the form of what is known as Cartesian dualism. (Descartes was the philosopher who introduced the idea of the 'two realities' of 'Mind' and 'Matter' that so-called 'Realist' Physics has followed ever since.)

Unfortunately, Mach did not live long enough to mend the situation. He died in 1916, aged 78, eleven years after the publication of Einstein's Theory, his own contribution to Physics being swamped by celebrity, at the time, of Einstein among the comparatively unthinking and unphilosophical public. However, the popularity of Einstein's Theory, which was the 'seven day wonder', as it were, has gradually waned to the extent that nowadays there are more and more commonsense thinkers challenging it, some reverting to the earlier relativism of Mach.

Had Mach lived longer he would undoubtedly have told us exactly what his reservations were regarding Einstein's version of relativity. However, the logic of his rejection is not difficult to uncover. This tracing of Mach's logic, his 'unfinished business' with relativism, has now been continued under the name of Normal Realism. This Neo-Machian philosophy now forms the basis of the mathematical thesis, POAMS (the Pope-Osborne Angular Momentum Synthesis), as described in the POAMS thread of this forum.

Normal Realism began under that title in Pope's association, in the late 1960s, with another mature student, G.A. Evans, in the Philosophy Department at the University College of North Wales (UCNW), Bangor. The mathematical aspect of the thesis had already begun, ten years earlier, with the help of Drs. J. R. Jones and P. M. Davidson of the Physics Department of the University College of Wales, Swansea. This mathematical treatment was then extended, in 1978, in an association with Dr. J. Hopton of Burton on Trent Technical College and then with Dr. A.D. Osborne at Keele University, Staffs., where it remains an ongoing research project. This research has also involved the Electronics Engineering Department of the University of West of England (UWE), Bristol, where it has been supported by a long-time associate of Pope's, Prof. A.F.T Winfield, who has also helped with developing and disseminating the thesis in publications, lectures and seminars.

As a version of neo-phenomenalism and partaker in the Linguistic philosophy of Wittgenstein *et al*, Normal Realism has gone from strength to strength, particularly in respect of its modern-physics spin-off, POAMS. Its most definitive expression to date is the latest in the line of POAMS publications, a book entitled *Light-Speed, Gravitation and Quantum Instantaneity* by authors, A. D. Osborne and N. V. Pope. This book is presently at the printer's and is due to appear soon. It is aimed to appeal mainly to graduate students of mathematics, whilst being careful to keep the ordinary intelligent non-specialist reader 'in the loop'.

However, despite its appearance as a work in specialised mathematics, the main thrust of this book is *philosophical*. In that respect it has been regarded as unique, insofar as it combines expertise from both sides of the traditional Arts-Science educational divide. Indeed, it is what many think is the scandalous lack of contact between these two academic disciplines that the book holds responsible for the all-attested proliferation of nonsense in modern theoretical physics. ■