

Hur Fysiken utvecklats

Och vad den betyder för Mänskligheten

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Yet another of those unread books I remember from my parents library. It was bought by my father in July 1950, the same month I was born, and I like to think of him as reading the book at the time. It is a Swedish translation, but as far as these kinds of texts go, I suspect very little is lost in the process. Sir James Jeans, as the title of the author is prominently displayed on the cover, was a distinguished physicist and cosmologist of his time (most people who achieve fame are contemporary with it, few fames survive their physical manifestations, and even fewer attain it posthumously, and really what is the fun of fame to you who are not to savor it, or to others who are denied basking in it?) and I must have been vaguely aware of his status. As implied I never got around to read it in my youth, a pity most books make a deeper impression on you when you were malleable than what they do later, on the other hand your time of youth is limited, and there is hardly time to press everything in it, and if so, what would be the point of your future life?

Now the book is not that great after all, although a pleasant enough of a read. The story it tells is straightforward and conventional and asserts some standard truths whose status is long since up for reevaluation, and whose times consequently have been spent and ought to be gone. Most crucially, Aristotle is taken for task for not observing and experimenting, although the author grudgingly admits that he may have observed when biology was concerned but as a physicist he was a disaster. This is received knowledge. Observation is overrated when it comes to acquiring knowledge, and as to successful experimentation that requires a high degree of technological sophistication, and is above all far from being easy and immediate. All true search for knowledge starts with curiosity and asking questions, it is the inability to ask the right questions, or maybe the misfortune of not doing so, that stalls progress. Alchemy being a case in point, which was an activity filled with observations and experiments of sorts, but unguided by probing and relevant queries. As has been noted, all that blind activity did after all develop techniques and routines, which would later be of some help, but that was more fortuitous than intentional. The author claims that Stevin (as well as Galileo) actually showed that things of different weights fell at the same rate. This is remarkable as it is not at all that easy to show, in fact Galileo is supposed to have concluded it from a thought experiment, and thought experiments are always risky, but as mainly the successful ones tend to be retained in memory, the evidence for their merits is skewed. And to show that a body on which no forces are acting follow a straight line of uniform velocity is definitely something which is beyond normal experiments, to say nothing about normal experience. To assume so is to do violence to your intuition and excel in daring hypotheses, which lies at the heart of real breakthroughs.

One third of the book is devoted to the pre-history of science, although in terms of

achievement this is just a tiny fraction of its history. The reason for this is fairly obvious. Without an embarrassing riches of details, it is easier to get an overview, and also the relative simplicity of the science involved makes it more accessible to the general reader and thus also more transparent. There was the heroic time of astronomy abetted by mathematics and mechanics of the 17th century which was consolidated during the next century. The great breakthroughs of science on a much wider front did not happen until the 19th century, it was then for the first time science really started to make a difference and effect the quotidian life of society. We are speaking about the development of chemistry, i.e. transforming the purely speculative theory of atoms, bequested by the ancient Greeks, to an empirical science with a potential for real development. The subtitle of the book ('And what it has meant for Mankind') notwithstanding, there is surprisingly little discussion of the latter¹, yet the development of chemistry, whose basis is physics, a fact that has become even more pronounced by the modern rise of quantum theory, did have a tremendous practical impact as the discovery of electricity would eventually have. Initially though, the impact of the latter, was mostly on the theory of physics which was transformed from a predominantly mechanical and tangible science, in the spirit of Descartes, to a more esoteric, when small solid particles as conceived by the Old Greeks gave way for waves and an electro-magnetic theory, preparing the ground for the eventual abolishment of classical physics for quantum theory, a theory which in spite of tremendous and unprecedented experimental corroboration reached such a status of ontological confusion that it seems to hover at the very limit of human understanding, being a triumph of formalism and technical skill over conceptual accessibility.

The ambition of the book is avowedly non-technical, there is no mathematical reasoning, nor any formulas, and hence it does not make any attempts at penetration unlike the 'Restless Universe' by Born². Have I learned something new? Of course I have, or must have had, although it is hard to recall off hand what. There is always some value of reading through material with which you are fairly familiar, it consolidates what you know by repetition, one of the most time-honored methods of learning, be it based on the comfortable illusion that what is repeated often enough is eventually accommodated to your understanding, be the basis for it however spurious. And it also makes the addition of new knowledge so much easier as there is already a structure to which to attach it.

Then the crucial question is what does a historical narrative add to the understanding of science when the general public is concerned. From a logical point of view the historical approach is not always optimal, there is too much confusion. This is usually understood by authors hence the idiosyncracies of a strict historical presentation are usually played down if not altogether ignored, the result is what is usually referred to as whig history. The temptation to avail yourself of the wisdom of hindsight is irresistible especially if your ambition is of the didactic kind. On the other hand a historical narrative is naturally engaging in a human kind of way and to get understanding it is seldom enough to have an impeccable formal presentation, your imagination has to be engaged. This is usually

¹ One suspects that the subtitle was added on the urging of the publishers in order to boost sales, while the author being a physicist would naturally, not to say inevitably, be more fascinated by the subject itself than by its social impact.

² Reviewed in this volume

referred to as motivation, you have to understand the question before you can appreciate the answer, and this is where presentations usually fail, and this holds in particular for popular ones. Thus a historical approach can make a difference both to the ignorants, who encounter something for the first time, but even more so for the expert, who can reach a deeper understanding if being privy to how a concept has really evolved and what is so remarkable about it, because its significance cannot always be appreciate in a logical presentation. But such a history of science or mathematics is demanding to write and actually requires a lot of historical research, it is so much easier to be merely descriptive, pointing to highlights and present pleasant anecdotes, although the value of such an undertaking should not be underestimated. One case in point is Bell's 'men of Mathematics' which made a deep impression on me as a young teenager and may very well have been instrumental in making me chosing mathematics, for allt its faults, and those are very glaring indeed when I encounter him much later in life, he makes mathematicians into heroes, intellectual role models worthy of emulation. In a sense it is a book written for children and in effect I read it as a child when it should be read. Would Jeans book have had the same impact on me had I read that as a child? I doubt it.

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