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ACCEPTED MANUSCRIPT

Is Philosophy of Any Use for Scientists?

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This is a question which would certainly divide physicists in particular and scientists in general. Being aware of that, here I would like to take the successful career path of an excellent physicist as a positive example, supplemented by my own humble and negligible experience. I do hope that a bit of such discussion would be useful in the current rash state of scientific research in China.

Anthony J Leggett is currently a physics professor at both University of Illinois at Urbana-Champaign, Illinois, USA and Shanghai Jiao Tong University, Shanghai, China. He was awarded the Nobel Prize in physics in 2003 for his theoretical work on superfluidity (https://www.nobelprize.org/nobel_prizes/physics/laureates/2003/). He has always been asking probing questions, very much to do with his training in philosophy in his undergraduate years at Oxford University, UK—before his curiosity was aroused, and his ambition was initially not in physics/science, that is, he did not learn physics until entering graduate school. Evidently his success so far owns a lot to such an experience—he says, two mental tools learnt in his philosophical training have been enormously helpful: how to state a problem clearly and how do we know an assertion is valid. In addition to his achievement in superfluidity, his work on macroscopic quantum phenomena has a tremendous influence in related fields [1-3]. Though already a world class expert on quantum physics, same as Einstein, Schrodinger and others, he has been deeply concerned with the foundation of quantum mechanics is more than a theory; any amount of effort to make it clear should always be needed.

Leggett has also been trying to make his sober thoughts accessible to wider audience. His unassuming name Tony has been equally known among students, colleagues, and casual acquaintances. His popular science book, The Problems of Physics [4], was published one year ahead of Hawking's A Brief History of Time [5], in which many problems discussed still remain open. Curious readers may easily find the opposite philosophical tendencies implied in those two great popular science books: the positive attitude was taken in The Problems of Physics and a negative one assumed in A Brief History of Time. The latter is a clear show of great confidence of some physicists armed with the tremendous success of physics. As a physicist, I am certainly pleased with such an assuring view. Nevertheless, as a serious cutting-edge researcher, perhaps the sober attitude in the former may be better to lead us to new discoveries, and, to paradigm shifts.

Needless to say, Tony finds great happiness in interacting with budding scientists and all kinds of students. For example, last a few years he has been teaching a class on superconductivity and superfluidity to both undergraduate and graduate students annually in Shanghai, China. Not surprisingly, professors have been found in this class, too. He also found time to interact with primary, middle and high school students worldwide: in China alone ranging from Pingliang Second High School in the "wild" west of Gansu to Suzhou North American High School in the "sophisticated" east of Jiangsu, encouraging and nurturing curiosity in young and developing minds. His typical words are, no question is stupid. I still vividly remember the scene at my Seattle home that my daughter, in primary school, explained to him that how black hole would be formed.

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