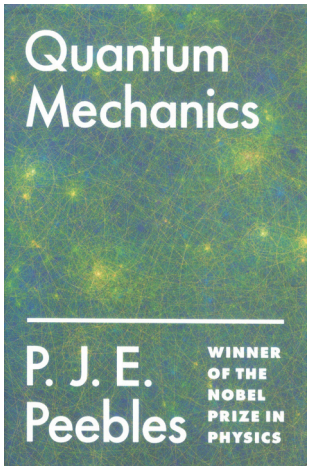

Quantum Mechanics. P. J. E. Peebles. Princeton University Press, 41 William Street, Princeton, New Jersey 08540, USA. First Paperback Edition, 2020; Copyright 1992. xiv + 419 pages. Price: US$ 80.00/ £62.00.

Few topics in physics prod teachers to experiment with the layout of their exposition of the subject as does quantum mechanics. Almost everyone in the profession has one's own way of introducing the subject to the students, and all books on this topic tend to strike a different path. Some prefer a totally theoretical viewpoint, and show the development of quantum mechanics through the eyes of a fictional theorist. Fictional, because in reality quantum mechanics was born of an intimate collaboration between theorists and experimental physicists, unlike the general theory of relativity which emerged from a theorist's mind. This book is no different in this aspect, and attempts a different approach to the subject. In an interview he gave for the oral history project of the American Institute of Physics, the author, P. J. E. Peebles said: 'I don't think the book is particularly good for everyone, because it's my own idiosyncratic approach to teaching. The quantum mechanics is entirely standard, but the approach is the one that I like and I don't think it's for everyone'. The book grew out of an undergraduate course he has taught many times at the Princeton University, USA, and the notes that he prepared for it. Peebles once said he could not find any textbook that really pleased him, and that he started writing down the equations and later inserted words between them. Finally, a student helped him to piece them together in the form of a book.

It is an idiosyncratic book, no doubt, and has its own strengths (and weaknesses). Peebles' use of order of magnitude estimates, even in the introductory chapter, will be useful for students to get a grasp of the way a physicist thinks. For example, right after solving the Schrödinger equation for the hydrogen atom, he gives the example of why cold fusion does not work and estimates the rate of fusion. Such examples abound in the book. As the author writes in the Preface: 'People looking into physics for the first time tend not to like this part of the subject, but since it is an essential part of the game one does well to get used to it as early as possible'. Although dazzling in their brevity, some examples may leave the average student more puzzled than illuminated, especially in the beginning of the book. For them, it may be a better idea to come back to this book once they have got a good grounding of the subject. Some students may find the use of cgs system of units in the book a throwback, but it is the system that astrophysicists use.

One of the best chapters of the book is undoubtedly the treatment of the hyperfine transition of the ground level of the hydrogen atom. This transition, resulting in radiation that has a wavelength of 21 cm, has become the single-most important tool of radio astronomy. Being an astrophysicist (Peebles was awarded the Nobel Prize in Physics in 2019 for his contributions to the development of modern cosmology), the author's choice of this particular topic is natural. Appearing after the chapter on perturbation theory, this example deals with the interaction of the hydrogen atom with electromagnetic radiation in great detail, more than that can be found elsewhere.

Another highlight of the book is the discussion on the measurement of quantum mechanical systems, to which many standard books, apart from a few exceptions, do not devote much space. In the words of the author: 'a discussion of open questions in the measurement puzzle may be a useful antidote to our tendency in physics textbooks to gloss over complexities'. To this end, the book does a laudable job of laying bare the riddle that quantum mechanics continues to present even to modern physicists.

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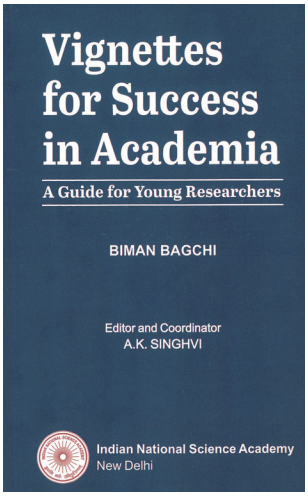

Vignettes for Success in Academia: A Guide for Young Researchers. Biman Bagchi. A. K. Singhvi (Editor and Coordinator). Indian National Science Academy, Bahadur Shah Zafar Marg, New Delhi 110 002. xvi + 197 pages. Price: Not mentioned.

Biman Bagchi, an eminent scientist in the field of physical chemistry with experience spanning over four decades, has well-articulated a highly impactful guide for young minds to help them to focus and build confidence. In this book, he discusses the fundamental issues that Ph.D. students face from their early days till they become independent researchers and has outlined feasible solutions for them. Therefore, the book can serve as an essential guide to researchers at any stage of their career. It is a must-read for students who want to pursue a Ph.D. and academic career, young assistant professors, and more so for the leaders who step into the academic system as Directors/Vice-Chancellors (VCs) because the author talks about all facts candidly. A reader can consult this book before, say, attending a Ph.D. or job interview, selecting a thesis supervisor, deciding where to do his/her Ph.D. – in India or abroad, becoming a teacher or a Director/VC. Reading the book gives a feeling of listening to a veteran convincing/advising us to do the right thing in academia.

As the famous saying goes, 'there is no alternative to hard work' and this is most relevant for research. Bagchi begins the book by narrating in the first chapter how one can become a hard-working student. He emphasizes many essential characteristics that students must possess, such as creativity, competence, discipline, seriousness, good behaviour, humility, knowledge

and communication skill, which are truly necessary for research and beyond. Detailed advice on various aspects such as Ph.D. from India or abroad, how a Ph.D. adviser should be chosen, etc. is given to a beginner in research. Unlike earlier days, now having multiple subject areas in mind while choosing an adviser has become a compulsion. However, this has to be taken positively by the beginners. Bagchi's advice for Ph.D. students and young faculty for success in science is to be sincere, creative and hard working as possible, which have been the keys to success in every aspect of life. Researchers should do a self-appraisal and self-criticism to improve themselves. However, the author warns that these need practice as well as determination. When it comes to understanding a difficult subject, he advises that reading alone will not be enough. Rather one should write, make a flowchart and discuss it with others. He quotes George Bernard Shaw who said: 'Too much reading rots the mind'. To be a reasonably good Ph.D. student, one should have a few qualities that a Ph.D. adviser looks for, such as quick thinking, being interactive, having a little humour, etc. Furthermore, for overall development, Ph.D. students should be good givers; in other words, they need to have helping minds. Along with self-evaluation, self-correction is highly recommended by the author, keeping away from self-justification. Bagchi has expressed his opinion about how to train students' minds to excel in studies and research, mentioning that they should stay away from using the internet and various mobile applications – this is a bit of crucial advice, and such advancement of technology does have a negative effect not only on researchers, but all students. Towards the end of the book, Bagchi urges students to leave their comfort zone, search continuously for new ideas and problems, and learn new techniques. In other words, they should choose challenge over comfort.

In one of the chapters (29) Bagchi comments on the topic of publishing. He suggests that people should follow C. V. Raman's approach to publish first in an Indian journal. However, this is not a practical advise for young minds. I refrain from elaborating on this in detail.

I have enjoyed reading this book and recommend it to every student. Bagchi has presented his advice, suggestions, and opinions nicely and precisely. The book can indeed motivate students. It is informative with impulsive stories of a few scientists whom the author has personally met. The author's own story is also outlined for the sake of sharing his experiences. I appreciate and thank Bagchi for this commendable piece of writing for the young minds.

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Annual Review of Public Health, 2021. Jonathan E. Fielding, Ross C. Brownson and Lawrence W. Green (eds). Annual Reviews, 4139 El Camino Way, P.O. Box 10139, Palo Alto, California 94303-0139, USA. Vol. 42. xv + 553 pages. Price: US$ 118.

At the time of writing this book review, the COP26 summit in Glasgow is underway, aimed at addressing the climate crisis, a real existential threat. Climate change impacts all facets of human existence, including health. In this volume of the *Annual Review of Public Health*, several articles address the issue of climate change and public health. Stephan Lewandowsky in his article 'Climate change disinformation and how to combat it', initially outlines the period of public hesitancy regarding climate change and an emerging consensus. He discusses the drivers of climate scepticism, the sources and strategies of disinformation as well as the approaches to countering disinformation and communicating in an adversarial environment. I found this article an excellent start to the volume – lucidly written yet comprehensive. It is a 'must-read' article that addresses the needs of generalists as well as those specifically interested in climate change. Binns *et al*. address the issue of 'Climate change, food supply and dietary guidelines'. The authors outline how climate change affects the global food supply – including the rise in temperature on plant growth and ripening, adverse weather events, spoilage, contamination at various stages of agriculture, processing, transport, storage and a decrease in food diversity, among others. They also review the current status of dietary guidelines, the changes that are needed to ensure sustainable food production and the issue of food equity. Accelerated sea-level rises with climate change threaten those who live in coastal, low-lying areas. Solecki and Friedman in their article 'At the water's edge: coastal settlement, transformative adaptation, and well-being in an era of dynamic climate risk', discuss the options of people living in these locations, including the notion of managed retreat and relocation. They discuss the issue of place identity and place attachment, and the fact that the loss of sense of place is physical and social (for instance, in the loss of kinship), cultural and economic. While the loss of place is not a new phenomenon, the possible scale that this might entail with unmitigated climate change is worrying. Ebi *et al.* write about 'Extreme weather and climate change: population health and health system implications'. They focus on extreme events influenced by climate change in terms of heavy precipitation, intensity of droughts, desertification, dust storms and compound events. They further discuss the health-related impact of these extreme events on mortality, occupational health, infectious disease, exacerbation of non-communicable disease, injuries and mental health. These articles while discussing the issue of climate change and health at a macro-level, force us to reflect on our actions that contribute to climate change. In a broader context, I believe they also challenge public-health researchers to translate their research into action, since climate change is not an issue that we can be distantly passionate about.

Two articles in this volume will immediately resonate with issues we are facing during the current pandemic. Ali and Cowling discuss the tracking, prediction and forecasting of the influenza virus. The article highlights many methods of virus surveillance that have become commonplace during the COVID-19 pandemic. The authors highlight the need to track real-time transmissibility and forecast disease outbreaks in terms of peak timing, epidemic duration, attack rates and peak magnitude. The importance of these methods has become all too clear in the last two years, both for health planners as well as for economists and the political leadership to make evidence-based decisions. The article is also a reminder that health surveillance methods need to be strengthened across the globe, if we are to effectively address future pandemics. Holwell described the practice of variolation against smallpox in colonial India. Variolation gave