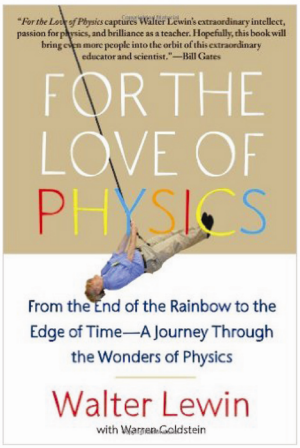

For the Love of Physics: From the End of the Rainbow to the Edge of Time—A Journey Through the Wonders of Physics. Walter Lewin with Warren Goldstein. Free Press, New York. 2012. 318 pages. Price: Rs 399.

Walter Lewin, a well-known astrophysicist having more than 450 scientific articles to his credit, and who chose to spend his career teaching physics to undergraduate students for 43 years at the prestigious Massachusetts Institute of Technology (MIT), USA has come up with this delightful, engaging and accessible book after his retirement.

The book is not a technical one, but is meant for general readers where the author's main goal is to share the joy of learning that the world we live in is a knowable place. Warren Goldstein, who enjoys the honour of writing the introduction in this book, mentions how each of the 94 lectures by the author, now made available at MIT OpenCourseWare, YouTube, iTunes-U, etc. is a masterpiece appreciated worldwide and gives a whole list of responses and experiences Lewin received as a teacher from the student fraternity and his fans all over the world. He mentions that Lewin's inbox is flooded by e-mails with subject lines like 'You have changed my life!'. This reminds the reader of another such great Nobel laureate physicist Richard Feynman, who again chose teaching as a lifetime job, and was famous among his students at Caltech, USA, for his unique teaching style of making physics interesting.

It is a tough job to write a book on physics without a single mathematical expression and yet covering a vast range of topics from mechanics, properties of matter, wave motion, electromagnetism, cosmology and astrophysics and successfully explaining how the everyday things work, how physics sees the complex and the easy things happening in nature, and moreover, how beautiful it is to understand the physics behind them. The first of the 15 chapters discusses about the personal life of Lewin, including how he was forced to move from the Netherlands to USA during the World War II, while half of his family was murdered by the Nazis and then how he eventually got into research, made path-breaking discoveries in X-ray astronomy and became world-famous as a teacher.

Chapter 2 entitled 'Measurements, uncertainties, and the stars', though appears quite a basic one, is of utmost importance, according to the author. In Lewin's own words 'All important in making measurements which is always ignored in every college physics book is the uncertainty in your measurements.' The chapter also discusses measurement techniques involved in estimating various astronomical parameters. The next three chapters deal with the properties of matter, discussing thoroughly Newton's laws of motion and gravitation, the problem of the pendulum, fluid dynamics and phenomena related to light such as interference, diffraction and production of a rainbow. Chapter 6 is devoted to wave motion, discussing effects like resonance. Chapters 7 and 8 present a lucid discussion on the laws of electromagnetic induction, the history behind the production of electricity, historical review of electromagnetism as well as Maxwell's theory. What is unique in this book is that the author also provides weblinks for various demonstrations which may help the reader understand the concepts better. The reason behind this is that Lewin has always placed emphasis on live demonstrations in the lecture hall during his lecture sessions at MIT.

Chapter 9 entitled 'Energy conservation' is a bit off from the main content of the book, but equally important as well, since readers are made aware of the energy and food crisis which our future generations are going to face, through simple calculations involving high school-level mathematics. Possible solutions to this are also discussed under the heading 'Where are we going to get what we need?'

Chapters 10 and 11 related to X-rays are the author's home-ground and hence one can justify the large number of pages spent on this seemingly less important topic. Chapters 12–14 contain some thoughts on cosmology, which has been a fascination among laymen. These chapters discuss cosmic rays, neutron stars, black holes, X-ray binaries with a mention of experimental techniques implemented as well. The final chapter, 'Way of seeing' enlists the reasons why most of the students find it difficult to study physics, and explains how our way of seeing, i.e. the approach towards the subject must be changed. The two appendices succeeding the acknowledgement section are interesting, and it becomes clear why the authors have deliberately placed them at the end, only after reading them. Though being a non-technical book, it also contains an index which is a common feature of standard technical books in science.

The book keeps reminding the readers about the physics behind the tiny and complex miracles happening around us. It creates interest among those who are new to physics and it makes the students who are already introduced to it, love the subject.

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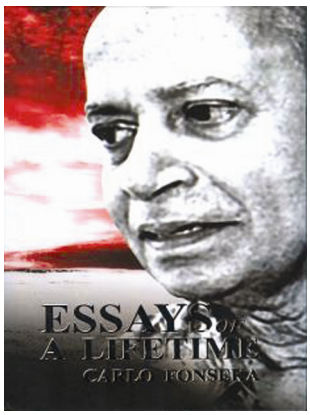

Essays of a Lifetime. Carlo Fonseka. S. Godage & Bros (Pvt) Ltd, Colombo, Sri Lanka. 2016. 368 pages. Price: SL Rs 1320/US$ 20.

There was a time when science was just one endeavour among many for the great scientists of the world. For example,

Isaac Newton was a true polymath – a celebrated master of astronomy, chemistry, mathematics, physics and theology[1]. Another polymath was Charles Lutwidge Dodgson, more popularly known by his pen name Lewis Carroll. He was an Oxford mathematician, Anglican theologian, musician, author, publisher and political scientist to whom is attributed the electoral system of proportional representation which is presently the subject of raging debates in Sri Lanka and a matter of personal interest to me as I labour at the Election Commission in Sri Lanka.

Science now, however, is so specialized with small incremental advances that there are few polymaths today. Carlo Fonseka (MBBS (First Class), University of Ceylon; Ph D, University of Edinburgh; Emeritus Professor of Physiology at the University of Ceylon (now Colombo)) is exception – engaging in medicine, management of public bodies, theology, music, left-wing politics and many other things, and bringing these to the public through op-ed pieces, and radio and television talk shows.

The book under review consists of a collected volume of Fonseka's selected writings and speeches over a lifetime on diverse topics such as medicine, science, philosophy and ethics, religion, economics, politics, education, the arts, the biographies he has written and his travel experiences. The selection has 34 essays written between 1971 and 2014. Of particular note is the first chapter, appropriately titled 'To err was fatal'[1], wherein his honesty Fonseka details the five deaths he attributes to his erroneous interventions, where it is clear that he is being too hard on himself. Recent studies in the US showing that 'iatrogentic damage (defined as a state of ill-health or adverse effect resulting from medical treatment) is the third leading cause of death in the US, after heart disease and cancer'[2] prove Fonseka to be the incorrigible iconoclast he is for speaking of truths that other doctors are not comfortable with.

The book has been positively reviewed before[3] as is natural for one from a much-loved public personality. I do not wish to detail the book and take away the thrills of reading it. What I will focus on is Fonseka the man. For that is relevant to understanding what he writes and benefit from the lessons his life offers to us.

Fonseka graduated in medicine from the University of Ceylon and earned his doctorate from the University of Edinburgh. His doctoral work on how the pituitary gland puts out growth hormone has become the stuff of textbooks. Two of his papers have each been cited over 100 times.

Greatness in life involves the ability to communicate. Almost all great men evince this truth. Most successful men in Sri Lanka are no exceptions and products of the church and her schools which gave them their skills. To cite one striking example, S.W.R.D. Bandaranaike was a product of Anglican education. Most public spokesmen of the LTTE were Tamil Christians although for its membership the LTTE was rarely able to draw from Christians.

Likewise, Fonseka is a complete product of the Roman Catholic Church and her St Joseph's College, Colombo. His versatility with the English language is such that I have met a doctor who a generation later preserves his handwritten notes on physiology that he took down as Fonseka lectured, as a monumental work of literature. Around the year 2004, we shared the same office while being members of the University Grants Commission of Sri Lanka and, in the absence of his secretary, I had the pleasure as his friend of typing his articles as he dictated. They were always perfect on the first go. (Unfortunately the privileges of high-up government service had then prevented him from learning the computer. It now appears that he has become computerate, though not to the degree that he is literate.)

Fonseka is a man who is seen reading a different book each time one meets him, and can recite passages from books he read long ago. I rate him Sri Lanka's best prose writer today. His literary skills brought him the editorship of the Sri Lanka Association for the Advancement of Science in the late 1960s. He was also elected the President of the Section on Medical Sciences of the Association in 1986. His Presidential Address on the subject of human violence attracted the attention of the Head of State, who procured and perused the script.

However, communication skills alone are not enough for greatness. The absence of taboos is another dimension of greatness. For example, in his stark honesty, Fonseka once confessed to me of how his conjugal engagements early into marriage in his house officers' quarters inordinately delayed him from visiting a patient in the ward. In his linguistic dexterity with command of the English language, he put it so elegantly whereas from another man it might have seemed crude vulgarity. It is that attitude and skill of his that gave the world the privilege of reading how medical negligence does lead to deaths even from caring, ethical doctors.

The medical school could not keep Fonseka engaged in the pedestrian activities of a university where today we[4]:

(i) Split what can be meaningful papers into small inane bits to play the numbers game (where administrators count papers because in the specialized world of science they cannot judge quality and depth through actually reading the papers and therefore just count papers for assessment).
(ii) Have journals which will publish anything for a fee, and clever academics have created so many citation indexes that make a mockery of journal evaluations.
(iii) See university administrations claiming that grant money is important as research because, in reality, overheads give them the best offices in a university.
(iv) Recognize even university ranking is subject to gaming.
(v) Every metric to measure quality is countered by clever academics by another metric they invent to cheat the system.

I am sure Fonseka saw this deterioration of the university ethos early and left behind his high-powered research in physiology to work on more important things like superstitions, politics and religion. By far his most successful endeavour is his world-famous demolition of the myths behind fire-walking. Drawing from my upcoming textbook[5]: 'Carlo Fonseka became most famous for his scientific elucidation and personal demonstration of how fire-walking is done by Buddhist and Hindu devotees who walk across embers without burning themselves.' He starred in a British documentary where he fire-walked, an area where others feared to tread and had come a cropper by fire-walking to show that it can be done by anyone. In the process they had burnt their soles badly.

To demonstrate that there is nothing religious, Fonseka and his team deliberately

downed arrack (the local brew) and pork (which devotees abstain from to acquire spiritual power to do the magical walk) before successfully fire-walking in front of British TV cameras with British science fiction writer Arthur C. Clark watching (https://metavideos.com/video/1391344/fire-walk-by-prof-carlo-fonseka).

He came out with the rules of how it is done – walking fast without allowing the soles to heat enough to reach ignition point to burn the flesh, and making the rectangular fire bed wide to make it seem big while the length one walks across is narrow, thereby giving the impression of walking across a large bed of embers, etc. He showed that the thick soles of the fire walkers who never use footwear also helped.

Fonseka's forays into politics, however, were a disaster because, although he acted with integrity, his associates did not. As a member of the Trotskyite Lanka Sama Samasamaja Party (LSSP), Fonseka and his LSSP friends under the late N. M. Perera, did Tamils proud by standing up for Tamil rights and parity of status for the Tamil language with the Sinhalese language. However, as the LSSP realized that the policy was not winning them votes, they abandoned their noble ideals. Fonseka had to lapse into silence.

As the political culture in Sri Lanka deteriorated, he withdrew into religion and music, and cultivated a new public persona to match. Whether for better or worse I am unable to decide. He completed an M A degree in Buddhism. Initiated into Sinhalese music at St Joseph's College, he has made a name for himself as a popular musician and one of his lyrics is now sung at Sinhalese weddings as the bride goes away. A dirge he composed was included in an award-winning Sinhalese movie.

In 2005, President Chandrika Bandaranaike Kumaratunga, widow of the slain leader Vijaya Kumaratunga (whose mother was Fonseka's first cousin) was rooting for her brother Anura Bandaranaike to succeed her as the Sri Lanka Freedom Party leader, while Mahinda Rajapakse staked his own claim. Fonseka inclined towards Rajapakse. In 2004, he wrote a newspaper piece on the Rajapakses of Ruhuna, which is among the essays re-printed in this book.

Again later as the LSSP alliance with the Rajapakse regime continued while the Government soured with the people, and was summarily voted out in presidential and general elections in the year 2015, his loyalty to the LSSP kept him silent as many unsavoury things happened. His foreign travels were limited because of his membership in a Communist Party. The US Embassy refused him a visa, but later relented because the visit was sponsored by WHO.

This period saw Fonseka working quietly in administration. The best testament to his value as a person is that when the Government changed in 2015, he handed in his resignation from the posts of President of Sri Lanka Medical Council and Chairman of the Vijaya Kumaratunga Memorial Hospital at Seeduwa. However, his letter of resignation was promptly returned by the new President. Such is the perception of him as being politically conscious and yet above politics.

In conclusion we may say of Fonseka what Newton's tomb at Westminster Abbey says in Latin: 'Mortals rejoice that there has existed such and so great an ornament of the human race!'

Thankfully, it is much too early for a real eulogy for Fonseka. God bless him and give us many more years of his insightful mind.

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