My Father, My Guiding Light*

It is almost a year since my father, Roddam Narasimha, passed away aged eighty-seven. He had always seemed invincible in my eyes. Since the beginning of the Covid-19 pandemic, he worked very long hours from home and (nearly) finished work on two books—one on his enduring love, turbulence, with his dear friends and colleagues from his Caltech days, Prof. Garry Brown and the Late Prof. Anatol Roshko, and the other, his translation of new verses from the *Yoga Vāsiṣṭha*. He also had a few papers accepted and collaborated on a Covid project with three of his former students and colleagues, aiming to analyse cough flows using the framework they had earlier developed to analyse cloud flows. He had promised to write about the future of civil aviation and the aerospace industry in India. In what would become the last of his public engagements, he paid rich tributes to his guru Prof. Satish Dhawan—whom he greatly admired and respected—on his birth centenary and was full of regret that no one had yet written his biography. There was so much more my father (Appa, as I called him) had wanted to do, and he had a contagious passion, a quiet ambition, an enviable focus and boundless energy and optimism to keep going until a few months before he passed away. Even while in intensive care during one of his hospital stays, he kept looking at the clock (like the white rabbit in *Alice in Wonderland*): “it’s getting late”, he said, and asked to be allowed to go home. It became such an obsession that the duty doctor had the clock taken off the wall. My father lived a rich life and enriched the lives of many around him. I inherited the privilege of being one of them.

Appa was born in a hospital in the Bangalore Cantonment (not too far from the Indian Institute of Science/IISc), where his maternal grandfather was a medical officer serving the British lancers. He often joked that he had not come very far from the place where he was born! He grew up in a large joint family with his parents, siblings and his father’s brother’s family in south Bangalore. His father R L Narasimhaiah (Shamanna, as my father called him), who had studied physics in Allahabad with Dr Meghnad Saha, and returned to teach it at Central College Bangalore, also built radios at home and set up a telescope in the courtyard for all to see the stars. In addition to the exploratory environment at home, my father thrived as a young man on book readings (in English, Kannada and Sanskrit) and discussions (on politics, philosophy and literature) on Sundays at the Gokhale Institute of Public Affairs founded by the literary giant D V Gundappa (popularly known as DVG). One of the books that had made a huge impression on him was *Man, the Unknown* by Alexis Carell. DVG wrote in a letter to Shamanna, how

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impressed and delighted he had been with my father’s critical analysis of the work. My father often recounted how these discussions gave him something valuable that he did not get from his formal education and spoke about DVG at his 125th birth anniversary celebrations some ten years ago. Appa went to school at Acharya Pathashala, an English medium school founded on Indian ideals, where Prof. C N R Rao was a classmate and where he had some brilliant teachers. One, in particular, Mr K Venkata Ramaiah, was very impressed with the brevity and clarity of my father’s answers. In an anecdote about “little things that matter to great people”, Mr K Venkata Ramaiah wrote how the visit of Sir C V Raman to the school to unveil a portrait of Madame Curie and to speak about her had proved inspirational to my father. When my father spoke of his school days, I felt his zeal and zest. He firmly believed in the importance of sparking the curiosity of children and enjoyed his visits to schools, including to the one his teacher founded after his retirement. He would often take with him models of airplanes and rockets to excite the students. His last lecture on a scientific subject (on clouds, another early passion) was to young members of the Bharat Scouts and Guides.

An early fascination with sky gazing and the sighting of a Spitfire on a visit to IISc during an Open Day spurred my father’s interest in aircraft design and fluid mechanics. A British Indologist, Dr John Marr, who Appa met during his tenure as Director at the National Institute of Advanced Studies (NIAS), was so captivated by his fascination for the Spitfire and its curved contours that he sent him a model, with movable wing and tail flaps. My father went to IISc to pursue his interests under the tutelage of Prof. Satish Dhawan, a time that he enjoyed immensely and learnt a great deal from. He then went off to Caltech, USA, for his PhD, a time that expanded his horizons and that he recounted with much fondness. There, he worked with Prof. Hans Liepmann, whom he greatly admired and respected, and returned to Bangalore to join the IISc as faculty at the Department of Aeronautical Engineering. Appa was a patriot and an optimist: he had been greatly influenced by Dhawan and wanted to ‘do in India’ and ‘do for India’. He was recently disappointed that he had not been offered a ride on the Tejas, the indigenous Light Combat Aircraft that he had made a case for developing almost forty years ago.

Some years after he returned from Caltech, he married my mother in a simple wedding ceremony with less than a dozen people. My mother had been introduced to him through her sister’s husband, who had been Appa’s classmate in college. I was born in the house that my grandfather built in south Bangalore, and when I was just over four years old, we moved to the campus of IISc. My first memories are almost certainly reconstructions from photographs and audio recordings of our conversations that Appa made during the year we spent in Glasgow before that. Years later, it amused me to hear myself say in a strong Glaswegian accent, “I am a wee Scottish lass”. During my school years, Appa made it a point to correct me when he saw I
had gotten something wrong (‘Miss Bala, not Bala Miss’ was among my earliest recollections) and made me feel alright about getting into trouble or getting fewer marks for doing things right. When the school closed for summer, he designed holiday homework to keep us (me and my sister Aditi Simha, who sadly passed away almost three years ago) busy. Every morning, we would go eagerly with our books—old ‘Senate Papers’ of the Indian Institute of Science: thick, matte, light green sheets that were cyclostyled on one side and used in reverse—and he would write down for us a list of activities for the day. This would typically include making observations on the trees and plants on campus, as for example, describing how the ‘propeller seeds’ of the Mahogany tree (that line Mahogany Marg behind the Faculty Hall at IISc) fall or counting the number of spirals that make up the bracts of a pine cone we had collected on a holiday in Kashmir, and to read and write down verses from the Bhagavad Gita (Mahadev Desai’s The Gita According to Gandhi was a favourite). It would be followed, when he returned home from work in the evening, with an explanation for how they fall the way they do (vertically and rotationally), or why those numbers (the Fibonacci series) are interesting, and he would teach us the meanings of words, how they must be parsed, and also how sentences are constructed in Sanskrit. Appa effectively used examples from the world around us—the manoeuvrable moves of the Drongo, the unpredictably graceful plumes emanating from lit incense sticks—to get us excited about concepts in physics and mathematics, and to make us aware that there are many things that we do not fully understand. He got us all interested in all the things he was interested in, the evolution of shapes and patterns, and also in fluid flows. We painted his favourite birds and copied his favourite quotes. He had carefully preserved these. We took photographs of clouds and covered the walls of our teenage room with fractal forms. I have often felt that all this must have subliminally influenced the things I became interested in many years later!

My sister, who was on the faculty of Physics at the Indian Institute of Technology at Madras, benefited from deep discussions with Appa when she was a PhD student at IISc. What seemed like enigmatic declarations—‘Fluid is isotropic’, ‘Fluid has no memory’—that he wrote on the board while teaching her Stokes’s equations began to make sense to me only in the last decade after I got interested in tissue dynamics and mechanics and began to think of tissues as fluids.

Appa taught us to consult books when we needed to find answers, and many that we collected over the years have had a big influence on me. He brought back kits from his trips abroad that allowed us to build things (like the burglar alarm we put together in our room at home to warn us that someone was coming in), and we became proud owners of a Timex Sinclair ZX Spectrum in the very early days of home computers. He encouraged us to paint what we saw around us, and still life (with an Indian twist), the trees (mine), the birds (Aditi’s) and elegant buildings became our passions. We had our versions of the Faculty Hall at IISc, our house on South Hill Ave in Pasadena, and the Round Church in Cambridge. Years later, I also
Top: (Left) Learning about the Fibonacci series through a pine cone. (Right) A Drongo painted for my father by my sister. Bottom: A quote from Galileo that I copied for my father.

appreciated how effective the schematic illustrations he made about his work were. He liked designing logos and loved to be surrounded by beautiful things.
My father’s teachings of Stokes’s equations to my sister.

We all joined Appa on his sabbatical visits to Caltech and Cambridge (UK). He had himself wanted to travel the world and did a fair share of it after his student days at Caltech. He did not think then that he might have an opportunity to do it again. He introduced us to new worlds, new landscapes and new cultures and made us aware of the differences. We enjoyed the road trips and all the stops in between as much as our final destination. He also took us along on his curiosity-driven adventures, as for example, to find Taramandalpet (Galaxy Bazaar) where Tipu Sultan’s rockets were manufactured, or the mango groves in Srirangapatna where his superior rockets had fallen and claimed its first British victims, the subject of his millennium essay for Nature (1999) more than a decade later. I had hated history in school, and it was after I saw that there was a different way of telling and interpreting history and that unearthing it could also be fun that my opinion shifted.

It was only much later that I realized that what seemed like a lot of fun and very different
from what we learnt in school was Appa’s gentle way of inculcating in us a sense of wonder, curiosity and inquisitiveness about the things we see and hear around us and showing us how to interrogate, interpret and understand them. Appa believed in the power of reasoning and impressed upon us the power of deep and thoughtful analysis. His questions always prompted a rethink of what I had ‘accepted’ even in subjects that I thought I was more of an expert than he was. When he had to have his aortic valve replaced some five years ago and was told by his surgeon about the risks of the surgery, he stoically remarked that with risks of that order, they would not test fly an airplane! What followed after we returned home from the hospital was a deep discussion on how the medical profession assessed the risks of treatments. He also thought of the human body as a one-hoss (horse) that ‘went to pieces all at once, and nothing first.—just as bubbles do when they burst’ (as Oliver Wendell Holmes so beautifully put it in his poem The Wonderful One-hoss Shay). The importance he assigned to ‘reasoning’ was also the reason he was attracted to the Yoga Vasishtha (some 250 verses of which he translated to English) and to the teachings of the Buddha and Manu, from which he often wrote down verses that he thought I should read. He taught us ‘to accept only what makes sense’ to us. Appa firmly believed that each of us has to find our way in the world and enjoy the journey. He introduced me to Hermann Hesse’s Siddhartha when I was in my late teens (and Hesse’s other works became a topic of discussion between me and Aditi over the years). And so it was that, without being forced, I made ‘doing science’ my profession (I really did not find anything more interesting or worthwhile) and found myself paying a lot of attention to how my father did things.

Appa loved to work more than anything else. He worked on a lot of things and did not squander any time. He used to like telling me, when I suggested he was working too hard, that he was not always doing hard work. But what he called ‘soft work’ was just hard work that he did not feel bound by obligation to finish by a strict deadline. All his insightful work on the history and philosophy of science and his interest in understanding Indian philosophy through reading Sanskrit literature, which also sparked my interest in history and philosophy, fell into this category. It brought him enjoyment and I think also solace. He also found a verse from the Bhagavad Gita to capture the enigma of turbulence and wrote it in his beautiful handwriting on the dedication page of G K Batchelor’s Theory of Homogeneous Turbulence. Appa did everything he did with an unparalleled seriousness, and delved very deep. He took his time but made it matter. He also liked to work on complex problems, and we often debated over long dinners, which was messier, biology or fluid mechanics, especially after my interest veered towards understanding tissue dynamics and mechanics, and he got interested in the kinds of problems I was looking at. He spent time picking the right word, often consulting the dictionary and edited drafts over and over again. Monier-William’s Sanskrit-English dictionary was a
The verse from the *Bhagavad Gita* (bottom) written by my father on the dedication page of G K Batchelor’s book (top). The verse expresses the mystery of ‘enam’ (‘this’, ‘the soul’). A loose translation might be ‘some look upon this as a marvel, others speak of it as one; still others hear of it as a marvel even having heard it, no one understands this’. favourite, the only work I have heard him refer to as scholarly. The end result was beautiful, often magical. Appa did not take to editing drafts on the computer despite my attempts over the years to convince him to do it. That changed only in his last year when an iPad with a pencil and ‘Goodnotes’ made him feel that what he could do on the screen was nearly as good as marking on paper! I think he liked seeing the corrections he had made more vividly and permanently, and in his own hand. Appa also taught us all aesthetics and elements of design, whether it was about visualizing quantitative information or designing our home and furniture with my mother. He liked symmetry and order, and this sometimes led to amusing discussions about how well one can keep lines straight on slightly curved surfaces! He also inspired discipline. As kids,
it was our duty to ensure, using a checklist he had made for the purpose, that everything that needed to be on the dining table was on it before we sat down to eat. Dinner time was sacred, a time for all to 'relax and converse'.

My father loved his students—he had close to fifty—and they became part of our extended family and his legacy. They came home often, or when they were in town, and talking to them about all the things that interested him, often over tea and sweets, or drinks or dinner, and more recently on the phone or by email, was, I think, his favourite pastime. Over the years, many also became his closest friends and trusted colleagues. He shared with them all his interests, discussed problems, and sought their advice on scientific and other matters, gizmos, everything. He (and sometimes all of us) visited them when he travelled abroad. He was very proud of their achievements and aspirations and could not stop singing their praises when he received the Nature Mentorship Award this time two years ago. He was very moved that they had nominated him for it. They fondly called him Meshtru, the Kannada word for teacher. Some told me recently that Appa was also like a father to them. They all looked after him and kept him in good spirits, and were deeply concerned about his health. Some have known him for longer than my mother or I have, and through them, we keep discovering my father. Some, despite the difference in age, also became my early friends. We were all Appa’s students and are, as Prof. K R Sreenivasan, one of my father’s earliest students recently wrote to me, “bound by invisible threads woven by the Master”. My father also felt deeply indebted to all the people who helped him with instrumentation, administration, drawings and manuscripts, some for all these years. He treated them as partners and held them in very high regard.

Appa loved to talk to almost anyone who would listen to him and ask him questions—his siblings, cousins, nephews, nieces, students, colleagues, school children, his driver—and some of his colleagues made it a Saturday ritual that he looked forward to. He readily accepted invitations to speak—he spent a lot of time preparing even for the smallest of occasions—and when he spoke, his passion was infectious. Suddenly, people began to see clouds in a different light, as my colleague, Prof. Veronica Rodrigues (who sadly passed away almost ten years ago), who heard him speak about the ‘queen of the tropical skies’, confessed to me! He felt his mission was accomplished even if one person in an audience got something out of what he had said.

My father led and directed institutes, missions and programs, far many more than I was aware of until last year. I never once heard him talk about empowered committees or protocols. We also never discussed the politics of doing science but spent a lot of hours over the years lamenting about the direction that ‘scientific pursuit’ was taking: its conversion from a passionate hobby and profession to a cut-throat business, the emphasis on quantity, the lack of appreciation for scientific creativity and deep scholarship, or for tackling tough problems of fundamental
importance. In recent years he expressed concern, tinged with a sense of guilt and sadness, that he may not have prepared us for survival in today’s world. I assured him that I enjoyed doing what I enjoyed, and that I was comfortable with being different.

Appa helped me find my life’s meaning. He showed me by being a living example that it was possible to be a distinguished scientist and also live a simple and principled life. That it was possible to follow one’s intuitions and to be in peace with one’s soul. That life is rich but that it is also sometimes painful. He helped me navigate its tangled landscape and inspired me to be brave. And for that, I will be forever grateful. And that is what I will carry with me and pass on.

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