

Snippets of a Journey

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I studied in the Don Bosco High School, Chingmeirong, Imphal. When I was around thirteen years of age, my mother, Paonam Shyama, who was a Lecturer of Chemistry at the Oriental College, and I would solve problems in Algebra and Arithmetic together. Many times, I was stuck, however, I discovered the joy in solving mathematical problems. She also told me about logarithms and exponentials, and also showed how to use the logarithmic table. I remember spending long hours trying to solve a particular problem. My father, Aribam Rajeshwar, an ophthalmologist, gave me enough space to discover myself, and allowed me to pursue what I wanted to. At every stage of my education, my aunt, Paonam Mema, a professor of Political Science, also supported me. Apart from my high school teachers I also had the privilege of asking lots of questions to Oja Tomba and Oja Thoiba.

Around the age of thirteen, there was a craze of skating among many of our friends. One of my uncles gave me an old pair of skates, which I got repaired and started enjoying skating too. Since then, skating has remained a hobby. Around this time, my mother borrowed the book “*A High School Geometry*” by *Hall and Stevens*, from one of her colleagues, and I remember how enjoyable it was to solve the problems in this book. I remember going to the annual book fair organized by the Manipur Central Library with my father, and it is there that I found some other interesting books. In fact, I used to go to this Library, sometimes accompanied by two other friends, Tarun and Malemnganba, to explore the books there. There I found a book describing the *Seven Bridges of Konigsberg Problem*. Much later, away from Manipur, I was deeply hurt when I heard that the old Central Library caught fire. During my high school, I met many friends, some of whom gave me a lot of encouragement, and who would discuss and solve mathematical problems together.

After my high school, I went to the Kendriya Vidyalaya at Langjing, for the senior Secondary School. Sometime later, my mother got me in touch with Oja H. Jayantakumar, Department of Mathematics, D. M. College. I still remember how openly he shared some interesting non-routine problems from the *Hungarian Problem Book*. This got me interested in the mathematical Olympiad problems. I also met L. Shanta, who is currently in the Indian Statistical Institute (ISI) Delhi, around this time and we spent a lot of time together solving these kinds of problems. Much later, I met Jayanta Manoharmayum, Department of Mathematics, Sheffield University, UK, who also shared many interesting topics and also told me a few things about mathematics. Often I visited the library at the University of Manipur to go through the problem sections of the “*American Mathematical Monthly*”. My mother also got me in touch with Oja Prof. M. Ranjit Singh of the Department of Mathematics at the Manipur University.

I went for my B.Sc. to the Ramjas College in Delhi. At some points of time, my parents suggested if it was not better to go for a degree in engineering. My brother Sanad and my sisters Jina and Awarmistha also supported my decision to go for higher studies in Mathematics. In Delhi, I got exposed to a larger number of people and initially got overwhelmed by it. What a pleasure it is now to recall the times that I spent, the hikes, the failures, and the trips and tours that I made with

my friends Hemant, Abhishek, Chaman, Amarjit and Birjit, in the hot summers or the cold winters of North India.

While in college, I got to participate in *Mathematics Training and Talent Search* (MTTS) programme in 1996. There I met many people, including Shanta, and Herachandra, presently at the Department of Mathematics of Manipur University, both of whom became lifelong friends too. In fact, Shanta, Herachandra and I boarded the same bus from Imphal and then the train from Guwahati. The MTTS Programme was a lot of fun and I got to see mathematics from a different perspective.

During my MSc at IIT Kanpur, I had the privilege to meet some of the best teachers, and learn some very basic and foundational topics. Along with friends, we discussed and solved many exercise problems on complex analysis, many of those from the text books by *Ahlfors* or *Conway*. By this time, I had met a lot of people and friends who I spent a lot of time discussing world views, playing or having *chai* together, picking up the trivialities of life around or in silence. They have gone on to do different things, but we are still in touch. A friend of mine also showed me how to play the flute, which I still try to play occasionally. College life indeed went well.

After my MSc at IIT Kanpur, I went for my Ph.D. to TIFR Mumbai, in 2003 which I completed under the direction of Prof. Ramdorai Sujatha, an eminent mathematician, in 2009. I worked on the arithmetic arising from modular forms and elliptic curves. In mathematical analysis, we study functions by looking at their behavior in the neighborhood of a point, and there are similar things in Algebra too. The questions which I have looked at arose in trying to understand these two aspects more closely. It took me quite a long time to really learn a piece of Mathematics and I really had to struggle during this time. However, with the support of the professors, friends and the visitors there, I had a very good time and saw some very nice mathematics. I also discovered the joy of taking long walks and hiking there, and started enjoying Indian classical music too. I also met Geeta, who had come as a Post-Doctoral Fellow in TIFR, in the Department of Nuclear and Atomic Physics.

TIFR is set in a beautiful place, at the shore of the Arabian Sea. It has a very compact building but the composition of the Library, the auditorium, the offices, the canteens, the gardens, the sea shore, the waves dashing against the rocks, and the paintings are very inspirational.

Manipur and the people of Manipur have also been going through turbulent times in all these years. Each time I hear news of turmoil in Manipur I feel deeply hurt. Often I feel if we are giving the younger generation the wings to fly and the dreams and environment to come back home.

I went for my Post-Doctoral studies at the University of Heidelberg, Germany, and got to learn about European life and culture. Geeta also got a Postdoctoral Fellowship in the University Hospital in Heidelberg. After spending nearly four years in Germany, in 2013, I joined ***Indian Institute of Science Education and Research*** (IISER) Mohali as a Faculty in the Department of Mathematical Sciences. Then, I got a platform to interact with a large number of students, some of whom are working under my supervision. In the city, over time, I also found friends and a loving community of people at co Veda.



Fig1. My parents, Geeta and children



Fig 2. `Machoubi Paonam Mema

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