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PM Bhargava: Building a Culture of Science

By: Somdatta Karak

This is "a biography that tells us stories of PM Bhargava as a person, his growth as a scientist, his role as a scientific citizen, and most importantly of a person who tried to use science not just for his professional gain but also to influence how citizens could decide for themselves."

The culture in our country is many things, but science is not one of them. And, by science I mean asking questions and finding answers through systematic experimentation. By a culture of science, I mean a society, as a whole, depending on evidence for decision-making. The tightly controlled conditions of a lab experiment on a model system barely ever translate in a real-life setting. Thus, in most questions of life experiments are largely lacking. In the absence of feasible experiments, one is at the mercy of either logical arguments or emotions.

Making of Modern Biology

These are the dilemma that defined biologist Pushpa Mittra Bhargava's life. As a scientist grappling with the messy questions of life, he set up the first institute in India to understand the workings of life at the most fundamental levels - a living cell and its content that keeps it alive and functioning.

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Bhargava and others who started similar institutes and departments in a few other cities of India were at the forefront of modern biology in India. They were beginning the era of experimenting with living cells in India. This allowed biologists to make predictions and verify them with experimental data. They instilled the hope that biology - study of life - could be done systematically and that it could go beyond documenting the natural history and behaviour of living organisms. This came to be called as modern biology.

The book, *PM Bhargava: The Man and Making of Modern Biology in India* is a biography that tells us stories of Bhargava as a person, his growth as a scientist, his role as a scientific citizen, and most importantly of a person who tried to use science not just for his professional gain but also to influence how citizens could decide for themselves.

The author, Chandana Chakrabarti, spent a significant part of her career working closely with Bhargava, starting as an assistant and moving on to becoming a collaborator in projects promoting scientific thinking. She has written this book as a collection of stories of those times from her own memories of the incidents, notes from documents that Bhargava had kept for decades, and by interviewing Bhargava.

A Scientist First

If you enter the Centre for Cellular and Molecular Biology (CCMB) in Hyderabad for the first time, you will inevitably experience a sense of awe and fondness for Bhargava. The shape of the lab's main building and distribution of facilities on its floors reflects Bhargava's vision of scientists mingling and sharing resources. Then there is the sprawling art collection - Bhargava's sensibilities called for science and art to co-exist; the prized book collection from JBS Haldane's library reflects Bhargava's close relationship with accomplished scientists¹. The list does not end there. You might still meet some of the earliest members of CCMB who are proud that they were hand-picked by Bhargava for positions at the institute. Even the recently inaugurated auditorium complex on the campus is named after him.

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Outside the institute, in any remotely academic setup in Hyderabad, old timers sub-consciously judge a biologist from CCMB against the standards that Bhargava set for a scientist. Chakrabarti, in her book, gives enough examples for a reader to understand why

Bhargava continues to be revered. Young biologists will get a glimpse of the makings of one of the leaders in the field.

Born to a privileged, well to do and an academically inclined family in Uttar Pradesh, Bhargava grew up around deeply entrenched examples of caste and religious beliefs within his family. The young Bhargava was a prodigy who found his way into the academic circles of his liking. He impressed and befriended illustrious scientists across the world. He brought them to India to shape the future of biology in India. He was able to convince the political leadership to see the value of his proposal of building a national laboratory focused on understanding biology using modern tools - a major deviation from biology being under the shadows of chemistry. He built the CCMB and a scientific workforce around it to ring those ideas to fruition.

His journey, in many ways, can seem like one of those born to succeed. Whatever they touch, turns to gold. What Homi Bhabha was for the aspirations of growth of physics in India, Bhargava was for biology in India. But he was also more.

Building a Culture of Science

Bhargava did not look at biology only to make better technologies. The book places emphasis on his ability to understand the working of living cells, challenging godmen, astrologers and self-professed practitioners of medicine whose methods were not based on evidence. He fought with arguments, faced violent attacks by the mob on his property for the stances he took, and often suffered from lack of support from other scientists and policymakers. But he also received enormous love from the public who stood by him and supported him when the system could not..

Possibly the most telling of this tension was his attempt to build an exhibition on the methods of science. The book describes Bhargava's strenuous efforts at building a meticulously curated exhibition, devoting not only his time, ideas and energy but also pulling all his allies into the project, called "The Method of Science". As a result, scientists, science enthusiasts and artists built an exhibition that was to be displayed in New Delhi, the nation's capital. Bhargava had hoped it would present India with an atmosphere for building a scientific temperament. But with a change in political leadership in Delhi, none of that was to happen. The exhibition found residence in Hyderabad for some time. But not enough support to run it with the passion and intention it was created with. The exhibits were discarded without the makers' knowledge; only the art pieces remained in the benefactor's collection. The incident is a powerful reminder of the intolerance of ideas that a majority of the public in the country was not yet ready for. At the same time, the book tells of a successful recreation of the exhibition by B. Premanand, a rationalist in Kerala, that derived from Bhargava's conception.

Innovations through Biology

Modern experimental biology in India was shaped by a handful of people, in the 1970's and 1980's. This was at least a good two decades later than in the UK and the USA where most of the discoveries reshaping biology happened. It started with the discovery of DNA's structure and an understanding of the mechanisms of how DNA stores genetic information and how cells use this information. Understanding and utilizing those meant the capability to read cell's encoded genetic information as well as alter it, if need be. This is the foundation of biotechnology. Biotechnology is a part of all our lives through the food we eat or much of the healthcare that we seek. This book focuses on Bhargava's role in envisioning and introducing the change to India.

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Chakrabarti details how Bhargava built the political will and gathered the scientific force to justify the establishment of a national laboratory for modern biology - be it from giving modern biology its own space in India to getting the then Prime Minister, Rajiv Gandhi's nod to the proposal, to bringing the world's leading biologists to a fresh new institute to demonstrate its promise. It also elaborates on some of the research questions that CCMB would go on to ask, the collaborations it would forge and the unique support systems it would create. All of these set the stage for a focused effort on biotechnology in due course.. Because the focus is on Bhargava, the roles of other biologists in the effort can seem side-lined in this book.

The book is also replete with challenges that Bhargava faced along his way. The author sympathizes with Bhargava throughout, seeing him from the perspective of being a friend and a close associate.. It can at times seem like a one-sided narrative too. One of the crucial incidents mentioned in the book is that of the Bhopal Gas Tragedy wherein the author claims that authorities did not pay attention to Bhargava's suggestions to contain the impact of the accident. These are substantial claims and a reader deserves more details than what the book offers.

The narratives also make one ask if the adversities Bhargava faced stemmed from human jealousy or if a person's single-minded drive is doomed to face obstacles or if some ideas just take time for come to life. For example, one of the ideas of pathogen surveillance using molecular biology tools that Bhargava had recommended then is seeing the light of the day now. Bhargava provided refuge to India's first biotech company, Shantha Biotechnics, at CCMB in their pursuit to build the first recombinant vaccine in India in the 1990s and helped other pharmaceutical firms to incorporate modern biology ideas and tools. India now has a promising life science ecosystem where the vaccine industry leads the way.

Summing Up

In this collection of personal stories, there are some in great detail including those of Bhargava's personal life and his wife's contribution in kind to the ecosystem that he was building. And, it is important to look at the book through that lens. The author herself says that the book is a way for her to understand the years she spent working with Bhargava. But it is also a worthwhile collection of stories that tells us how human relationships are at the core of much of our development.

For anyone who has only heard of Pushpa Mitta Bhargava the book will help her appreciate why he was so venerated. And, it will also help them understand why Indians are still far away from evidence-based thinking. These are important takeaways for anyone who wants to see the country's scientific temper grow.

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Footnotes:

1 The book corrects one myth though. The Haldane collection is at CCMB because of the relationship the Bhargavas had with Haldane's second wife and the very curious, Helen Spurway. Bhargava and Haldane themselves did not share a particularly warm relationship.