

## Mamannamana Vijayan (1941–2022)

E. N. Baker\*

University of Auckland, School of Biological Sciences, Private Bag 92-019, Auckland, New Zealand. \*Correspondence e-mail: en.baker@auckland.ac.nz

**Keywords:** Vijayan; obituaries.



**Figure 1**  
Vijayan in his office in the Indian Institute of Science.

I feel honoured to have this opportunity to convey my memories of Mamannamana Vijayan, who died on 24 April 2022 after a long struggle with motor neurone disease. I, and many others, counted Vijayan as a very dear friend whom we will all miss deeply. At the same time, his legacy as an inspiring scientist, a thinker and a wonderful human being will live on, especially in India and in the many young people he taught and mentored there.

Vijayan was born in Kerala in 1941 where he grew up in an intellectual and politically engaged family, exposed to the ferment of ideas of post-independence India. Religious conservatism competed with ideals of political and social reform. He came to be a committed Marxist and student leader, while at the same time retaining a lifelong love of elephants and the music and colour of religious festivals. A living expression of the fascinating contrasts of India! Throughout his life Vijayan remained committed to his country and its development.

His first steps towards his scientific career came with his entry into crystallography as a Physics student at Allahabad University. He described this as a revelation, which he followed by enrolling for PhD studies in a nascent crystallography group at the Indian Institute of Science (IISc) in Bengaluru (Bangalore). When his supervisor M. A. Viswamitra left for postdoctoral studies in Oxford, Vijayan, as the senior student of the group, assumed a leadership role. This did not seem to bother him at all, perhaps foreshadowing what was to come. He made strong connections with G. N. Ramachandran (GNR) at Madras University, and there, early in 1967 at a meeting organized by GNR, met Dorothy Hodgkin, a pivotal event that transformed the direction of his life.

Vijayan accepted with alacrity Dorothy's invitation to come to work with her in Oxford. Offered the choice of working either on small molecules (antibiotics *etc.*) – an extension of his experience in India – or on insulin, a much riskier prospect with protein crystallography in its infancy, he chose insulin. The three years following his arrival in Oxford in January 1968 were transformative, both scientifically and socially. The multinational insulin group, then comprising Guy and Eleanor Dodson, Tom Blundell, Vijayan and myself, provided warm, free-and-easy social relationships, which led to lifelong friendships. A welcome haven from the bleak cold of the English winter! Above all, Dorothy's approach to science, which in turn pervaded the whole group, was a revelation. There was no overt direction, rather 'it might be a good idea to try this . . .', but her chemical intuition and remarkable ability to interpret maps were essential to the success of the group. And she and her husband Thomas were warm and generous hosts at their country home in Ilmington, through which passed a succession of visitors: 'famous, not so famous, revolutionaries, refugees . . .' as Vijayan put it in his memoir (Vijayan, 2020).

After its long gestation, the work on insulin proceeded apace during Vijayan's stay in Oxford. I recall the tremendous excitement early in 1969 when the first 2.8 Å electron-density map was traced onto acetate sheets and Guy and Vijayan found they could trace the polypeptide chain through it. There followed a stream of visitors through the laboratory, accelerating as news got out and a publication for *Nature* was hastily prepared. There were many requests for the work to be presented at meetings, often passed on to Vijayan or other group members. Highlights for Vijayan were his meetings with some of his scientific heroes, such as J. D. Bernal and Max Perutz. Others were unexpected, notably when Dorothy asked him to present the insulin structure to Margaret Thatcher when she visited the laboratory. The irony of an Indian Marxist presenting to an English Conservative was not lost on him.

Another milestone came with his marriage in 1969 to Kalyani who arrived in Oxford just in time to share in the excitement of the insulin solution. She had been a fellow PhD student with Vijayan at the IISc, and a highly distinguished crystallographer in her own right, and her gracious and loving support was crucial to Vijayan throughout his life. Dorothy became a surrogate mother to Vijayan and Kalyani, and when their daughter Devi was born during a later stay in Oxford, she was named Devayani Dorothy.

Vijayan and Kalyani returned to India in 1971, where Vijayan set out to fulfil his ambition of establishing an enduring research programme in protein crystallography at the IISc. He faced major challenges: doubts in India that such work could be supported; obtaining modern equipment in the face of political problems with the USA; fostering appropriate biological input; and overcoming power disruptions and air conditioning needs. On the other hand, his enthusiasm and determination were inspirational, both to colleagues and to students, and innovative ways were found to overcome difficulties. On one visit to the MBU, I was shown an extraordinary

bank of car batteries, connected in series, which provided a local version of an uninterruptible power supply for the X-ray equipment. His personal research interests included the structure and functions of lectins; the role of hydration in the mobility and action of proteins; and the structural biology of mycobacterial proteins. The latter helped to fully integrate recombinant DNA technologies and opened up opportunities for tuberculosis drug development as a flagship area for India. His greatest legacy, however, is probably the inspiration he passed on to his many 'students and grand-students' who now populate India's universities and research institutions. I always thought of him as a very humble man, never happier than when he could celebrate the successes of others. His door was always open and it was clear that he loved every day he spent in the laboratory.

Being profoundly committed to Indian development, Vijayan took on many national administrative roles. In an extraordinary record of service, he served on the councils of all three of India's national academies at different times, and was President of the major one, the Indian National Science Academy (INSA) in 2007–2010. In this role he also attended the annual meetings of G8+5 Academy Presidents, accompanying the ministerial meetings of G8+5 countries. He also made major national and international contributions to both biophysics and crystallography, organizing national meetings in both disciplines and serving on their councils.

Crystallographers will remember him for his love of the discipline, and the many contributions he made to it. He served on the IUCr Commission for Biological Macromolecules where, as Chair, he played a major role in developing IUCr guidelines for deposition of macromolecular data. He also served on the IUCr Commission for Small Molecules and the Subcommittee on the Union Calendar – a task dear to his heart for its role in disseminating crystallography worldwide, especially in under-represented areas – and was a Co-editor for *Acta Cryst. B, C and D*. He was highly involved in the Asian Crystallographic Association (AsCA) where his personal relationships throughout the Asian region were of great value; he was AsCA President from 2004 to 2007. He will also be remembered for the respectful manner with which he accepted the Ewald Prize in 1999, on behalf of G. N. Ramachandran, and his gracious presentation of GNR's work and legacy.

How will I remember Vijayan? He was a warm and generous man, and a wonderful host, whose love of India shone through. In formal settings he was invariably elegant, polite and gracious. In the laboratory, however, in scientific discussions, he was lively and ebullient, with his expressive hands and his infectious laugh. No wonder his students loved and respected him so deeply! Vijayan and Kalyani were also very generous hosts through whom my wife Heather and I came to love India too, with all its colour, beauty and rich heritage of architecture, philosophy and culture. Vijayan's final years were a struggle with motor neurone disease, which first began to trouble him when visiting us in New Zealand in 2012. As the disease progressed he was sustained by the selfless devotion of Kalyani and Devi – a true labour of love –

and for a considerable time also by visits, telephone calls and messages from his many friends, colleagues and students. Still enlivened by a love of science.

With the help of Kalyani and Devi, Vijayan completed a wonderful memoir just two years ago (Vijayan, 2020). His view of science, expressed there, is worth repeating: 'Much of science is unspectacular. Peaks occur only infrequently, and they are built on the overall edifice of science. Everest only exists in the context of the Himalayas. The overall effort should be to strengthen Himalaya. Therefore it is important to

emphasize the need for supporting science as a whole'. He finishes with thanks to the personal relationships he developed, the young scientists he mentored and his 'good fortune to mentor an area of science as a whole'. We are all so much the better for his life.

### References

Vijayan, M. (2020). *A Life among Men, Women and Molecules. Memoirs of an Indian Scientist*. Indian National Science Academy.