

## A teacher, a scientist and a guide, as I knew him

### *An obituary of Sachi Prasad Ray-Chaudhuri (1907–1994)*

Prof. Sachi Prasad Ray-Chaudhuri, former Head of the Department of Zoology, Banaras Hindu University (1960–1971), a doyen of animal cytogenetics and *Drosophila* genetics in India took his last breath on February 15, 1994, at his residence in Calcutta at the age of 86 after a short illness.

Born on September 15, 1907, in a Zamindar (landlord) family in Chittagong, now in Bangladesh, Ray-Chaudhuri completed his M Sc degree in 1931 from Calcutta University and Ph D from the Institute of Animal Genetics, University of Edinburgh, in 1941 under the guidance of Prof. H. J. Muller, Nobel Laureate, on the effects of extremely low intensity radiation on mutation frequency in *Drosophila*. He showed for the first time that the damage caused was proportionate to the dose, irrespective of its intensity.

He returned to India in 1942 and started his career as an honorary assistant lecturer in the zoology department of Calcutta University, where he was formally appointed as Assistant Lecturer in 1944. Later, J. B. S. Haldane, adjudicator of Ray-Chaudhuri's doctoral dissertation, helped him set up the first *Drosophila* laboratory in India at Calcutta University, where, besides research, theoretical and practical training of genetics were initiated as part of the M Sc curriculum in 1955–56. His appointment to the Chair of the department of zoology at the Banaras Hindu University in 1960 provided him with the opportunity of bringing animal genetics to the forefront of biological sciences in India. He introduced new teaching and research programmes, created an ambience in which all other emerging areas in animal sciences were initiated and nurtured and transformed the existing classical zoology department into a model for zoology departments in the country. He established a modern laboratory for *Drosophila* and animal cytogenetics that included the use of tissue culture techniques. He researched various aspects of radiation genetics, population genetics and cytotaxonomy of *Drosophila*, and the karyology of fishes, reptiles, birds and mammals. He supervised 28 Ph D students. His contributions in the areas of genetic effects of ionizing radiations and in the evolution and differentiation of sex

chromosomes in vertebrates have received international recognition.

Ray-Chaudhuri was a fellow of the Indian National Science Academy and was awarded the Sir Sunderlal Hora medal by the Academy. He was also conferred the D Sc (honoris causa) degree by the Kalyani University.

*Ray-Chaudhuri as a teacher par excellence.* I first met Ray-Chaudhuri in 1964 when I joined the zoology department of Banaras Hindu University (BHU) for my post-graduation. He was a teacher par excellence. His deep understanding



of genetics and evolution and his masterly exposition made his teaching of genetics and cytogenetics very lively and extremely interesting. During my M Sc special paper in cytogenetics, which I did under his supervision, I discovered that snakes are the only living species of vertebrates today which have preserved various states of differentiation of sex chromosomes in a remarkable manner. He immediately realized the potential of using snakes as a model system for understanding the molecular basis of sex determination and persuaded me to continue the same work for my Ph D degree. I very vividly remember his excitement when I showed him that it is possible to sex the individual cells of snakes based on the presence of W-chromatin body in the female and its

absence in the male. This became the basis of all our future studies.

*Ray-Chaudhuri as a crusader.* During 1968–69, I was sent, along with two assistants, to Digha in West Bengal to collect snakes. We collected a large number of cobras, kraits, tree snakes and sea snakes. One of my assistants was bitten by a poisonous sea snake while transferring them to a container with fresh sea water. He almost died, but we managed to bring him back from the jaws of death. The agony that we went through cannot be expressed in words. I had, of course, informed Ray-Chaudhuri about this incident by telegram. When we reached home we found Ray-Chaudhuri waiting for us in anguish and was greatly relieved to see us alive and well. He was very keen that all the snakes we had collected so painstakingly should be properly and quickly utilized before they died. I needed to set up a large-scale blood culture from these snakes, but there was no distilled water in the department. So keen and involved was Ray-Chaudhuri that he took me to the chemistry department and collected large quantities of distilled water that would see my work through. Hardly had a few days passed, that the university closed si'ne di'e on account of a strike. Here I was working day and night to finish the work before my snakes died, and there I was thrown out of the hostel along with the other students on account of the closure of the university. I was helpless and did not know what to do. Ray-Chaudhuri came to the laboratory and asked me to stay with him in his house until the university reopened. I stayed with him for nearly 2 months and everyday he and his wife stayed awake until I returned from the laboratory, which was usually after 11 PM, and gave him a detailed report of my progress during the day. The university reopened after 2 months but that was not all; there was more trouble awaiting me. It came to me as a shock when I learnt that the authorities had decided to expel me from the research hostel and stop my scholarship. When Ray-Chaudhuri saw my name in the defaulters list of the university, he immediately called me to his office. This was for the first, and perhaps, the last



time I saw him so angry. When I insisted that I was not at fault and that there was some mistake in the preparation of the list, he told me with steely determination: 'If you are found at fault, please remember, I will throw you out of the department. But if the authorities are at fault, I give my word that I shall see that the concerned authority is punished'. I accepted his conditions. As advised by him, I approached the warden of the hostel and obtained a no-dues certificate. But when I insisted again, as advised by Ray-Chaudhuri, that the warden write that there were no dues against my name when the list was prepared, the warden angrily refused to do so and, in fact, did not do so even after receiving a letter from Ray-Chaudhuri. Ray-Chaudhuri then wrote a strong letter to the Vice-Chancellor and to the Dean, Faculty of Science, stating how innocent students were being made to suffer in this manner without being at fault. An Enquiry Committee was set up and within a week an emergency meeting was held. I was found innocent. The warden of our hostel was asked to apologize to me in writing or to resign from the wardenship. He chose the latter. That was not enough. Ray-Chaudhuri did not rest until he made the Vice-Chancellor issue an order for immediate payment of my 4 months' scholarship that was held up. Thus, whenever he took upon his shoulders any responsibility, he crusaded till he reached a logical end.

*He was very humane.* When Prof. Ray-Chaudhuri moved to Calcutta University in 1971 after his retirement, I resigned from my Research Associate's position (which was a permanent post) at BHU and joined him in Calcutta University without any scholarship. He again kept me in his house for nearly a month before he could make an alternative arrangement for me. Within a week of my arrival in Calcutta, he was leaving with his family on a long tour. He called me and gave me a note which contained a detailed menu for a week from breakfast to dinner without any repetition and the recipe for each one was given as would be done to an uninitiated one. He said, 'You may sit cursing yourself for having come here or you take it very sportingly and start enjoying your stay in Calcutta. I hope you will do the latter'. That he was a fine human being came through so clearly on several other occasions.

*Ray-Chaudhuri as a dedicated scientist.* He had a small room in the zoology department of Calcutta University. I used to work in one corner of this room and also keep my snake companions, such as cobras and kraits. Ray-Chaudhuri was mortally afraid of snakes. One day I was working in this room, holding the head of a cobra in my left hand, with its tail pressed under my left foot and a syringe in my right hand, all set to take blood directly from its heart. Ray-Chaudhuri approached me slowly with his hand trembling and offered to hold the tail of the snake for me, trying hard to overcome his fear. This gesture touched my heart. It made me more determined than ever not to give up even in the most adverse of conditions. He made me feel that in this struggle he was always by my side.

Our work on evolution and differentiation of sex chromosomes in snakes laid the foundation for carrying out molecular studies. Unfortunately, facilities for such studies were not available in our country at that time. Luckily for me, I was selected for a Commonwealth Postdoctoral Fellowship for 1974-75. Dr. K. W. Jones of Institute of Animal Genetics, University of Edinburgh, agreed, although very reluctantly, to allow me to work in his laboratory on my own problem. I joined his laboratory on 22nd September, 1974. It was very frustrating in the beginning due to the non-availability of snakes in UK. Ray-Chaudhuri came to my rescue again. With great difficulty he succeeded in getting the permission of the Ministry of Education, Government of India, to send 50 live, poisonous snakes (cobras and kraits) to me to Edinburgh by an air-mail consignment of British Airways. He even paid the air freight from the contingency grant he had for his own research work in Calcutta University.

As predicted, based on our cytogenetic studies, we succeeded in isolating a sex-specific satellite DNA from Indian banded krait and designated it as banded krait minor satellite DNA (Bkm). Through my regular and frequent correspondence with Ray-Chaudhuri, I kept him informed of my progress in Edinburgh. In one of his letters Ray-Chaudhuri wrote: 'A large number of my students have gone abroad but this is a solitary example where a student of mine, Dr. Singh, unlike most of the Indian research workers going abroad, carried his problem and material from this country and worked out the

molecular aspects of the problem for which he had no facility in India. I wish there were more of this type of research collaboration between India and other countries advanced in research.'

Ray-Chaudhuri's excitement about our work on snakes in Edinburgh was clear through his letters. In one of his letters he wrote: 'I shall continue to remain excited about the progress of your work. Lately, the frequency of communication between you and me has dropped down considerably and much of it is due to me I suppose. I assure you that I shall write to you as frequently as you shall do.' These instances testify his intense love for science.

It was our snake study which revealed to the scientific world for the first time that the Y chromosome is strongly sex-determining and only a very tiny part of the Y chromosome is necessary and sufficient to convert a female mouse into a male. It is the snake study which has led to the development of Bkm-derived probe for DNA fingerprinting, which is being used in our country. The fundamental basis of all these discoveries goes back to the snake work done by Ray-Chaudhuri and his students in India.

Ray-Chaudhuri led a long life of exemplary determination. He continued to work in Calcutta University until recently. Until the very end of his life, his quest for knowledge was unsatiated and he remained keenly interested in and aware of the research activities of his students.

Ray-Chaudhuri visited Edinburgh again in 1981 with his wife and stayed with me. His visit was a memorable experience for us. After returning to Calcutta he wrote to me in his letter of 29th May, 1981: 'I cannot express how delighted I was to have been able to visit you in Edinburgh. I never thought that it would be possible but now I realize that nothing is impossible. I am used to receiving love and affection from my people in abundance since the time I became a teacher and now at the fag end of my life I am realizing how precious they are.'

In his demise we have lost a teacher par excellence, a dedicated scientist, a crusader and above all a fine human being. I wish to record our heartfelt homage to the departed soul.

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