

Prasanta Chandra Mahalanobis

Satyendra Nath Bose*

The difference in age was not much—Prasanta was only 6 or 7 months older but we got acquainted when, after completing our educational apprenticeship, we had started our professional career in whatever we selected as the most coveted in life. Nationalism was in full swing. In the year we passed out, almost all, who got the hallmark of the University as meritorious students, rushed to the laboratory of Acharya Jagadish Bose¹ or to the laboratory of Acharya Ray². We induced Sir Ashutosh³ to agree to have post-graduate classes in the Science College although at the time of the first world war it was almost impossible to import any instruments from abroad. We searched out places where expensive instruments were lying idle. Sir Ashutosh arranged to collect them all for us and the young men stepped into new work with great zeal.

Prasanta had a slight advantage. With the war still on, he had already come back with a stamp of success from Cambridge. He returned with the idea of engaging himself on research in mathematics and physics in this country for some time. Presidency College lacked suitable teachers at that time. No foreigner was coming and the government placed him there as a professor. In this place, a lot of new work kept

Prasanta busy. Prasanta was greatly impressed by reading about the new methods of science. He started thinking whether statistical methods would throw light on the many problems and much discussed questions in this country. He applied the acknowledged scientific way. He thought that, in spite of the division of rank of the Brahmins and Shudras in Hindu society and the fear of the caste system of Manu, according to statistical laws, the upper class of Bengalees came from approximately the same rank. According to the views determined by statistics the same group should be considered as their common ancestor.



For this purpose, a good deal of measurements were taken—characteristics of the shape of the head—length of arms and legs—and a lot more!

He continued with the work of teaching physics in the Presidency College and after some time, according to rules, he had to work as Director of the Alipore Observatory. A number of meritorious students went to Mahalanobis to make a deep study of the new methods of statistics and to learn about their applications. Many among these who got together at that time earned a

good reputation and are at the forefront in statistics. Prasanta is to be praised for such achievements by Indians. He made the foreign government understand the substance. For economic upliftment of the country, it was necessary to realize how much we were merged in misery and darkness; for this he arranged to collect data by travelling throughout the country. And by explaining to the government the effect of taking special measures—in which the statistical method was the chief—he arranged for the teaching of the new science.

It started during the British regime—at the time of Suhrawardy⁴, later on there were many changes—Jawaharlal⁵ came and blessed this endeavour. By the indefatigable labour of Mahalanobis a large field of education and research grew up round Amrapali⁶ and spread throughout India like the banyan tree which produced many institutions in different provinces. To-day branches of ISI exist throughout India. The experts of the Planning Department are now taking into consideration the plans of Mahalanobis to give shape to the future plans of the Central Government.

At first, I and Saha⁷ taught physics only. The war had ended; in the meantime, the news of the latest conclusions written during the war on the theory of relativity and the theory of quantum mechanics propounded by Planck⁸, Einstein⁹ and Bohr¹⁰, whose names are now remembered and extolled in every home, had started coming in for just a few years. Dr Deben Bose¹¹ had started working at 92 Upper Circular Road¹² on his return from Germany after his release from internment. I had been learning German from him and translating Einstein's new monograph on the curvature of the path of light in the gravitational field. Dr Saha had learnt the German language himself. He had at that time translated all the writings of Minkowski on the mathematical formulation of the theory of relativity. Prasanta Chandra was teaching that subject—he also wrote a

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¹Sir Jagadish Chandra Bose; ²Sir Prafulla Chandra Ray; ³Sir Ashutosh Mukherjee.

⁴H. S. Suhrawardy: Chief Minister of Bengal at that time; ⁵Jawaharlal Nehru; ⁶Amrapali: Residential house of Mahalanobis named by Rabindranath Tagore; ⁷Dr Meghnad Saha; ⁸Max Planck; ⁹Albert Einstein; ¹⁰Neils Bohr; ¹¹Dr D. M. Bose, who later became the Director of Bose Institute; ¹²Location of Bose Institute founded by Sir J. C. Bose.

thoughtful introduction. Through our joint collaboration, a set of articles on relativity was published in the form of a booklet by the Calcutta University. It had been in circulation in different countries for quite some time. It is perhaps not available now.

Saha went away to Allahabad and I to Dacca. Prasanta retired from Govern-

ment service after working for a long time as a professor and later made adequate arrangement for the teaching of statistics after coming over to the University. Afterwards, he served his country with devotion for about twenty years. He had the firm conviction that, through the measure of statistics, we would be able to understand the

realities of all problems and with it, would be able to think as to what the country should do. His talent was acknowledged in many countries. He had visited most of the countries of the world and his deep knowledge was recognized by world bodies. Till the last day of his life, Prasanta's only thought was statistics.

Scientific contributions of Professor P. C. Mahalanobis

Dwijesh Dutta Majumder

Background and perspective

A person's contribution in any sphere of life and society can better be considered in the context of the personality and the environment that led to his or her contributions. This is very much applicable to the case of the Professor, as P. C. Mahalanobis was popularly known to us. In this respect see the brief biography of P. C. Mahalanobis by his cousin and a colleague, Late Anikendra Mahalanobis¹, his scientific contribution by Prof. C. R. Rao² and a brief biography by the present author³.

In order to understand the versatility of P. C. Mahalanobis not only in respect of his contributions to anthropology, meteorology, flood control, statistics, large-scale sample survey, planning, agriculture, national income, information processing technology, operations research, quality control, educational testing methods, demography, sociology, ancient reptiles of India, speech research, linguistics, genetics, psychometry, manpower planning, haematology, social change and economic development, unemployment and under-employment, organization of science and technology, but also his contributions to social, cultural and intellectual movements, one has to visualize the background and historical perspective of the then Bengal *vis-à-vis* India. Because of the limitations of space, I am not attempting to provide the exhaustive list of bibliography which

is 271 scientific papers and five books as is given in refs. 1, 2, along with ref. 4 which contains appreciations and reminiscences of Mahalanobis by prominent scientists such as Simon Kuznets, Leon H. Keyserling, Edward H. Colbert, Alex Comfort, H. L. Shapiro, W. Edwards Demming, Academician I. Stefanov, A. T. A. Learmouth, Ashok Rudra, K. P. S. Menon, C. R. Rao, D. B. Lahiri, M. Mukherjee, Catherine A. Galbraith, and others.

P. C. Mahalanobis, M. N. Saha, S. N. Bose, N. R. Sen, J. C. Ghosh and their predecessors P. C. Ray and J. C. Bose are all products of renaissance which is also known as nineteenth century's new awakening in religion, art, culture, literature and science that spread throughout the country. His family background, his close personal acquaintance with Brojendra Nath Seal, Rabindra Nath Tagore in early life and C. D. Deshmukh and Jawaharlal Nehru afterwards was very important in not only making such massive scientific contribution but also in building up Indian Statistical Institute for advanced research and training, in starting the Indian Journal of Statistics — *Sankhyā*, in establishing Statistical Publishing Society and a large Electronic Computer Research and Development Centre.

Mahalanobis graduated with honours in physics from Presidency College, Calcutta in 1912 and passed tripos examination from Cambridge University part I in mathematics in 1914 and part

II in natural science (physics) in 1915 with a first class first in order of merit. In Cambridge, he came in close contact with eminent scholars like Srinivasa Ramanujan, G. H. Hardy, J. M. Keynes, Lowes Dechinson, Bertrand Russell and many others. His study at Cambridge had great impact on his life and works. He was awarded a senior scholarship to work at Cavendish Laboratory under the guidance of C. T. R. Wilson and J. J. Thompson, came to Calcutta to spend the vacation, joined the physics department of Presidency College as a teaching staff, got involved in many social activities and did not return. In 1948 he retired from Presidency College when he was its principal, and was made professor emeritus of the college. In the meantime he laid the foundation of statistics in India and of the ISI, which brought him and the country world-wide recognition, some of which we shall review in the next few sections.

Mahalanobisian view of statistics

If we look at the developmental history of mathematical systems or structures we see that they are in general suggested by situations which, while they are different, have some basic features in common so that their emergence is essentially the result of a process of unification and abstraction. A mathematical system, thus, lays bare the structurally essential relations between