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SNEHAMOY DATTA

(1894—1955)

Foundation Fellow

EARLY LIFE AND EDUCATION

SNEHAMOY DATTA was born on October 20, 1894 in a middleclass family in the village Sabhar in the district of Dacca, now in Bangladesh. His father Rakhaldas Datta was a school teacher, while his mother was a devout and accomplished housewife. His grandfather was a leading practising lawyer in the Dacca bar. Snehamoy lost his mother at an early age.

As a boy, he attended the Kishorilal Jubilee School at Dacca, where he had the privilege of having redoubtable Meghnad Saha as a fellow-student. He passed the entrance examination of the Calcutta University in 1909, securing a first division, while Saha stood first amongst the East Bengal candidates. In 1911, Datta passed the ISc examination of the Calcutta University from the Dacca College and continued to study BSc with Honours in Physics in the same college. He graduated from the Calcutta University in 1913, winning the Woodrow scholarship.

Since the post-graduate MSc course was offered only at the Presidency college, Calcutta, Snehamoy determined to leave Dacca, although the entire family was strongly opposed to the idea. However, Snehamoy's persistence prevailed. His father had to quit his teacher's job at Dacca and take up a similar job in Calcutta.

Snehamoy passed the MSc examination in Physics from the Calcutta University in 1915, with a first class, standing second in order of merit and obtained a gold medal and prize for his scholastic acumen.

PRELIMINARY TEACHING EXPERIENCE

He was selected as a Bengal Government Research scholar at the Presidency College in 1916, but could not join the post. Since he could not get a suitable opening elsewhere at Calcutta, he accepted a teaching job as a lecturer and demonstrator in the Department of Physics at the Tej Narayan Jubilee College at Bhagalpur for a couple of years (1916-1918). From 1918 to 1919, he served as a lecturer at the Patna College, Bankipur. During this period he also did some part-time research work which helped him to get the Sir TN Palit Research fellowship of the University of Calcutta and enabled him to carry out advanced physical researches abroad.



RESEARCH CONTRIBUTIONS

In London (1919-1922)

He joined the Royal College of Science, London, in October 1919 and obtained the DIC (Diploma of the Imperial College of Science and Technology) in 1920. During his DIC studentship period, he attended various courses of advanced Mathematics and Physics, including thermodynamics taught by Professor HL Callendar, Director of the Physical Laboratory, at the Royal College of Science. He also carried on an experimental Research work under the supervision of Professor AO Rankine on the *Electrical Properties of Selenium*. For this work he was awarded the prestigious Premchand Roychand Studentship of the Calcutta University in 1921. This was related to the measurement of the temperature coefficient of electrical resistance of selenium with a view to decide how far the photo-electrical properties of selenium were attributable to the changes in conductivity caused by changes of temperature. The paper was published in the *Philosophical Magazine* (1921).

Next he started experimental work in the field of spectroscopy in the Astrophysical laboratory under the guidance of Professor A Fowler, FRS. His first paper entitled *Vacuum Arc Spectra of Sodium and Potassium* was published in the *Proceedings of the Royal Society* (1921). Using Lord Rayleigh's improved form of sodium vapour lamp, measurements were made of the wave-lengths of sharp and diffuse series of sodium lines. A similar lamp was also requisitioned for corresponding measurements of potassium lines.

Channelised space emission bands were observed both in sodium and potassium. The heads of these bands were measured. The combination line IS—2d in potassium was resolved into a pair, the measured wave lengths being λ 4642.172 and λ 4641.585. The presence of potassium in the sun was also established, the first pair of principal lines being λ 7664.94 and λ 7699.01. It confirmed Megger's earlier work. Some additional sodium lines were also identified with solar lines.

His other paper entitled *Spectra of the Alkaline Earth Fluorides* was also published in the *Proceedings of the Royal Society* (1921). It gives an account of investigations undertaken to determine the possible relations among the band spectra of similar chemical compounds of different elements. The fluorides of alkaline earth metals were chosen and a more complete survey of the spectra of these compounds showed the existence of several new bands in the different spectra. New series of bands were observed in the spectra of MgF_2 , CaF_2 , SrF_2 in various regions of spectra. It was found that homologous series of different alkaline fluorides are connected by empirical equations which involve the series constants or the molecular numbers of respective compounds.



In continuation of the previous work, a paper entitled *The spectrum of Beryllium Fluoride* was also published in the *Proceedings of the Royal Society* (1922). The spectrum of BeF_2 was found to consist of six groups of bands, all in the ultraviolet, between λ 2800 and λ 3400, and all fading towards the red. The strongest band at λ 3009 was investigated in detail and was found to include three series of lines, which departed considerably from the usual type of formula.

He then engaged himself in accurate measurements of the absorption spectrum of potassium vapour, which was published in the *Proceedings of the Royal Society* (1922). The principal series lines in the spectrum of potassium vapour upto $m = 42$ were observed as absorption lines. The whole series could be represented very closely by the formula. $h_1(m) = 35008.40 - 109736.1 / (m + 1.29667 - 0.06154/m)^2$. In addition to the absorption of the lines of the principal series, new lines were found to be absorbed at higher pressures, which apparently showed no correspondence with the new lines in the emission spectra.

However, he found the combination lines IS—2d (λ 4642) and IS—3d (λ 3349) to be absorption lines, supporting the conclusion drawn by Foole, Mohlar and Meggers, who described the excitation of a certain type of combination lines in a new form of discharge tube in which the applied electrostatic field can exert no influence upon the radiation. This was discussed by Datta in the note to *Nature* (1922) entitled *An Exception to the Principle of Selection in Spectra*. His last paper in London entitled *Effect of Bromine Vapour on Nitrogen Bands* was published in the *Astro-physical journal* (1923). Varying the pressure of bromine vapour in a discharge tube containing nitrogen he found that the second and third positive bands of nitrogen were blurred. He ascribed this to the action of the strong electric field on the electronegative ions of bromine. It was also suggested that probably Stark effect was responsible for the displacements found by other workers.

On the basis of the above-mentioned research works, Snehamoy Datta was admitted to the DSc degree of the London University in 1922. Regarding the quality of his research work and talents, Professor A Fowler FRS made the following remarks :

The work with which Mr S Datta has occupied himself has been mainly of an experimental character, demanding a wide knowledge of physics and skill in the manipulation and adjustment of delicate instruments, besides new great refinement in the measurement of photographs. I consider him to be well prepared to engage in such researches, and confidently expect that he will make valuable contributions to science if opportunities are afforded him.

I may remark that in presenting his papers to the Royal Society, Mr Datta proved himself capable of stating very clearly the nature of his work and the results at which he had arrived. I am of opinion that he would be an



acquisition to the *Indian Educational Service* for which, I understand, he is a candidate, or any other service requiring capacity for independent research in physics or related subjects.

I may also add that he is a young man of active habits and agreeable manners, and of sociable disposition.

July 4th 1922

A Fowler
Professor of Astrophysics

As a further tribute to the excellence of his research work in spectroscopy, the following letter of appreciation from Professor SR Milner of the University of Sheffield may perhaps be quoted.

The University, Sheffield
Oct. 11th 1922.

Dear Mr Datta,

Thank you for your very valuable papers on band spectra which you were good enough to send me a few days ago. I have been interested in band spectra ever since Mr Curtis did his work on the Helium bands here.

I have been intending to write to you since your valuable work on the potassium absorption spectrum was published; to ask if you mind letting me know whether you are going on with the Cs, Rb, Li and similar absorption determinations. Miss Mathews, one of my lecturers, for nearly three years has been working on the K absorption, and at the time your paper came out had reached the stage of getting good photographs with the grating, although I must say, I don't think they are as good as your very fine ones. The work was undertaken to test for the presence of variations at the end of the series which Hicks had found in sodium, and which your results show exists here also. But, of course being very busy with teaching she only gets on very slowly, and if there is any prospect of your extending your potassium work to the other elements, I shall probably advise her to take up another problem. So I shall be much obliged if you could give me a hint as to whether you intend to continue with other metals of the group.

Yours sincerely
SR Milner

Incidentally, when his erstwhile class-fellow Dr Meghnad Saha visited London for the first time, Snehamoy introduced him to Professor Fowler and induced him to do theoretical work in the Astrophysical Laboratory of the Imperial College of Science & Technology for about five months. Saha had the greatest regard for Professor Fowler, and always spoke with warmth



and gratefulness of the encouragement and help he had received from him in London. Years afterwards, he wrote :

I took about four months in rewriting the paper entitled : 'On a physical theory of Stellar spectra', which was ultimately published in the Proceedings of the Royal Society, London (1921) and all the time I had the help of Professor Fowler's criticism, and access to his unrivalled stock of knowledge of spectroscopy and astrophysics. Snehamoy Datta worked in London from October 1919 to June 1922. On his way back home, he spent three months at the Physikalisches Institut Güttingen, attending seminars and lectures of celebrated German spectroscopists.

At the Presidency College, Calcutta (1922-1940)

Snehamoy Datta returned to Calcutta and joined the Presidency College in December 1922. He got an appointment in the Senior Bengal Educational Service as an Assistant Professor of Physics. A few years later, he was promoted to the post of Professor and Head of the Department of Physics at the Presidency College.

He was spell-binder of a teacher. He prepared his class lectures with meticulous care and delivered them extempore with precision and lucidity. His three years' stay in London University, had made abiding impressions upon his youthful mind. It had broadened his mind and widened his scientific outlook. It had brought home to him the dignity of a teacher and boundless possibilities for the advancement of scientific research in our country. He soon collected a band of devoted research associates around him and plunged deeply into diverse fields of experimental spectroscopy.

His first research paper from the Presidency College was entitled *Regularities in Band Spectra* and was published in *Philosophical Magazine* (1923). It was a theoretical attempt to find a general equation which might explain the different types of spectral series found to exist among band heads. He derived a semi-empirical general formula approximating to
$$\nu = 9244.8 + m(274.75 - 29.0n) + (-0.75)m^2 + 1748.2n + (-14.5)n^2,$$
 where the constants are of the order predicted before. The significance of the afterglow bands were attributed to the ionization potential measurements in nitrogen. Next he investigated the ionization produced by the combined thermal and electrical excitation of salts of Na, K, Li, Mg, Ca, Sr, Ba and Hg in the Bunsen flame and published a paper (jointly with S Sen) entitled *New Method of Determining the Ionization Tension of Elements* in *Zeits. f. Phys.* (1928).

He also studied the absorption of potassium vapour using a carbon arc, fed with uranium compound as source. By adding nitrogen, it was shown that the absorption depends upon the total pressure and not upon that of potassium vapour alone. The paper entitled *Effect of Pressure on Absorption of Spectral Lines* was published in the *Indian Journal of Physics* (1930) in



collaboration with SN Roy. *The Absorption spectrum of Rubidium Vapour* by S Datta and HS Maitra was published in *Zéits. f. Phys.* (1931).

New lines in the Absorption Spectra of the Alkalies was published by S Datta and B Chakravorty in *Indian Journal of Physics* (1932). The new lines could be expressed by an equation of the type

$$\nu_n = \left[S_{\frac{1}{2}} - m^2 P_{\frac{3}{2}, \frac{1}{2}} \right] + \Delta\nu$$

where $\Delta\nu$ measures the difference in wave-number corresponding to the vibrational transition of the molecules.

Long and Short spectral lines Parts I & II were published in the *Indian Journal of Physics* (1935 & 1936) by S Datta and KN Chatterjee.

He remained at the Presidency College till the end of 1940, which extended over a span of nearly eighteen years. During this period he was recognised as an eminent educationist. He was then transferred to become Principal of Rajsahi College, which was considered to be a Government College, next only to Presidency College in academic excellence.

At the Rajsahi Government College (1940-45)

Under his stewardship, Rajsahi College soon became very well organised in the scientific disciplines. Many good students who would have otherwise come away to Calcutta remained back to continue their studies in Rajsahi College. There he proved himself to be an able administrator and strict disciplinarian.

Unfortunately, however, due to lack of research facilities and suitable equipments at Rajsahi College, he was compelled to terminate his basic researches in spectroscopy. Instead, he became interested in industrial research programmes under taken by the Department of Industries of Government of Bengal. He engaged himself in a fundamental research problem which involved wide knowledge of both mechanical engineering and metallurgy. His *Investigation on the Composition of Printing-Metal Alloys* was published in Bulletin No. 105 of the Bengal Industrial Research Board and formed a landmark in the field of printing technology. Towards the end of 1945, he foresaw a cloud of communal disharmony in the academic horizon of East Bengal. He found it to be destructive of intellectual work. Consequently he became anxious to return to Calcutta.

Back at Calcutta (1946-1954). Since no teaching post was immediately available in a Government college he had to serve in the Bengal Secretariat at Calcutta for a short while. Later on, in January 1947, he became the Director of Public Instructions of undivided Bengal.

Although only three years to go before formal retirement, he worked very hard, working on office files, till late at night, touring the schools and colleges throughout Bengal, and after partition, throughout West Bengal. Indeed,



he was the man to bring a sense of orderliness to the institutions and the directorate. He exuded a sense of purpose and dedication and set an example to all who worked with him by his tenacity, composure, and hard labour.

After his retirement from Government service at the age of 55, he joined the Calcutta University as a Registrar. He occupied this post for 5 years until he reached the University superannuation age of 60. During this brief period, he introduced many salubrious measures for the welfare of the teaching community of the Calcutta University.

HONOURS

In his professional life, Professor Datta received many honours. He had been associated with the Indian Science Congress Association in various capacities for a long period. He was elected a Foundation Fellow of the National Institute of Sciences of India (now the Indian National Science Academy) in 1935. He was also a Foundation fellow of the Indian Physical Society since 1934.

FAMILY

In 1925, Snehamoy Datta married Srimati Sudha Basu, elder sister of Josyti Basu, the present Chief Minister of West Bengal. They had three children—two sons and one daughter. The eldest son Ajit Datta graduated in Chemistry and studied for MSc in Organic Chemistry in the Calcutta University. However, before finishing the MSc course, he went to USA and got the MS degree in Pharmaceutical Chemistry from the University of Purdue, Indiana. Subsequently, he joined the Stanford University, California where he was admitted to the PhD degree in Pharmaceutical Chemistry in 1955. He returned to India the same year and became the Scientific Manager of the Hoechst Pharmaceutical Company in India. Unfortunately, he passed away at the early age of 40.

The daughter Aruna Datta was the second child. She was married to an engineer, Chittapriya Roy, who had training in Switzerland and in the Imperial College of Science & Technology, London. He has been working for J Stone & Co in the research and development section.

The youngest son Amal Datta became an economist, after graduating from the London School of Economics. Subsequently, he became a barrister-at-law and started legal practice in Calcutta High Court in 1962. Later on, he became involved in politics and became a Member of Parliament in 1982 as a CPI (M) candidate from the Diamond Harbour Constituency of West Bengal. He has retained his seat in the Parliament during the recent election in 1984 also.

THE LAST DAYS

While working as a Registrar, Calcutta University, Dr Datta developed an ulcer of the tongue. It was diagnosed as a malignant tumour. He under-



took radiation therapy treatment both in Calcutta and UK but to no avail. He witnessed the sunrise and sunset of hope. He suffered in all its various hues. He tossed through sleepless nights and cheerless days. Ultimately, passing through portals of suffering, he reached his goal on May 16, 1955, the goal for which we all are destined.

EPILOGUE

Professor Snehamoy Datta had few hobbies besides reading and writing. He was a gifted teacher and inspired generations of students by his teaching and researches. His refined and elegant taste manifested itself in his dress, gait and subtle humour.

A soft spoken person, with a kind and generous heart, he was always liked, admired and respected by his students, colleagues and subordinates. He showed remarkable tolerance in his approach to students and fellow people. He moved among us quietly without pride or ostentation an example to all of us. Of him it may well be said :

“Devoute yet cheerful ; pious not austere
To others lenient ; to himself sincere”.

He bore the acclaim of his admirers with modesty and strove by all means at his command to reflect their thinking in all his actions and decisions. In truth, he kept the “Common touch”. As an early student of his, the author remembers with gratitude, his helping hand during experiments his friendly smile, his encouraging words. These displayed through a life time became woven into a bright and shining pattern whose beauty warms and thrills us even yet.

ACKNOWLEDGEMENT

The author is immensely indebted to Sri Amal Datta MP, for his considerable help in writing the memoir of his illustrious father.

SD CHATTERJEE

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