

REMINISCENCES OF PROFESSOR BABU LAL SARAF

Babu Lal Saraf was an experimentalist par excellence who felt deeply for sound understanding of the basic concepts of Physics. He worked at the ground level, caring for students and associates alike. His enthusiasm and zest in evolving a novel program 'Physics through Experiments' was truly amazing. He got the willing assistance of his colleagues like Prof. S. Lokenathan and Prof. D.P. Khandelwal to name a few. He conceptualized a modular approach in developing various laboratory experiments in mechanics, optics and nuclear physics, to avoid duplicity of apparatus required. He designed and fabricated a unique Air Track bench to demonstrate and conduct a variety of experiments in mechanics. He cared to teach about precision and accuracy in his experiments in a way relevant to the understanding of the phenomena under investigation. No doubt soon his efforts brought him laurels through national and international recognition by way of UNESCO award.

It led to the demands from institutions in the country

and abroad for multiplicity of the apparatus. In the process, he wrote two guideline books on 'Physics through Experiments', explaining step by step procedures to conduct the individual experiments in an open manner, with emphasis on concepts involved. There is not an iota of doubt about the ingenuity of his approach towards conducting physics lab experimentation, far from the stereotype approach of black box approach hitherto followed. Truly it was a 'Master Experimentalist' approach. Some of the conventional teachers who themselves were never clear about the concepts involved found it hard to comprehend his approach that was based on emphasis of the foundational aspects.

Babulal was born in Badnawar, Madhya Pradesh in December, 1923 and breathed his last in Jaipur on 01 March, 2009. He graduated from Maharaja College, Jaipur and earned his Masters degree from Agra University in 1949. After a short spell of teaching he left for doctorate research at the Bartol Research Foundation of the Franklin Institute in

Swarthmore, Pa (USA) in early 1950's. He so impressed the senior physicists there with his experimental acumen that a series of Indian students followed later to that institute for doctoral research. It may surprise many that most of experimental nuclear physics related programs were developed in the Indian universities like Delhi, BHU, Kurukshetra, Punjab, Aligarh, Jaipur and Udaipur were by such Bartolian's Indians. Prof. Saraf designed and fabricated a magnetic spectrometer at Bartol that was later used for another decade by a host of researchers. His own study was on 'Inner Bremsstrahlung Spectra following e-capture' that earned him the doctorate degree from Agra University in 1958. A light mention may be made here of an incident that happened to Saraf during his days at Bartol. As he use to work hard in the lab., he often had to go to market for his grocery needs at night time. The Police there saw him drinking from a bottle on a pathway only to be surprised that it was milk to quench his thirst, as he was a lone walker at

that time!

On return from USA, he was offered a job by Dr. Homi Bhabha at the new Centre for Atomic Research he was establishing at Trombay. I first met him there in 1957 as I wanted to get his guidance about the offer I received from Bartol to complete my doctorate there, as facilities in Delhi University were far from adequate in nuclear research. He was engaged in building a Multi-channel Analyzer from scratch there. It was a sophisticated Instrument that hardly anyone dared to fabricate in India of those days. His ingenuity and experimental skill were outstanding. When he received an offer of a senior faculty position at Rajasthan University, Bhabha willingly

allowed him to take with him all the equipment that he had built for his experiments, to the University. Such was the status of leadership and vision in those days in our country. Prof. Saraf was soon made Professor & Head, Physics dept. at Jaipur.

Prof. Saraf soon discovered how stereotype were our teaching Labs. in the colleges and universities. Though he was successful in carrying some frontline research work at Jaipur with the nice equipment he carried from Trombay, his mind compelled him to do something about the laboratory system and infrastructure

that existed in the universities. He took up the task of building modern workshop facilities that would enable the teachers to design and fabricate experimental equipment to innovate and rejuvenate the stagnant system. Soon he could establish a working group of his associates and upcoming students. His home provided the open house for one and all, thanks to the ever-smiling and willing nature of Mrs. Saraf. As I had occasions to visit Jaipur on many occasions, I have never encountered such an open atmosphere of informal working while doing serious Physics.

Several unique open-ended experimental systems were evolved to conduct foundational experiments in mechanics, optics and atomic and nuclear physics. Detailed manuals were prepared to conduct each experiment to the satisfaction of the natural curiosity of a genuine student of Physics. Basic component units like Air track channels for collision studies, assorted compound pendulums, pulse and waveform generators, ac and dc regulated /variable power

supplies were designed and fabricated , with modern look and convenience in operation. The contributions were soon recognized nationally and internationally, as the professor was invited to an International meet organized by UNESCO. He won highest commendations there for some of his unique equipment. The experiments were not only demonstrative but cared to instill the significance of estimating accuracy and

precision of measurements. Soon the University Grants Commission took note of these developments. Grants started to follow and a special centre was established for the Development of Physics Education at Jaipur. Prof. Saraf organized a unique International Conference on ‘ Physics Education Through Laboratory Experiments ‘ that was sponsored by national and international agencies.

On his retirement in mid 1980's from University of Rajasthan, Professor Saraf continued to remain actively associated with the Centre for Development of Physics Education. Sponsors came by from private sector to duplicate his unique experimental equipments, as demands poured in from Colleges and Universities. Professor Saraf undertook several visits to institutions throughout the country for long time intervals,

taking his caravan of equipment with least care about his personal health and comfort. Later on, he was invited by the IPS Academy of Indore to establish a special Institute for Science and Laboratory Education (ISLE) that was duly recognized by Devi Ahilyabai University at Indore as its post-graduate and research centre for award of the higher degrees. He was designated as Eminent Professor cum Advisor for life

at that Institute. In spite of his health problems his zest for work appeared insatiable. He was truly a karmayogi of highest degree, who worked till his death at the age of 85 years for the sake of a bigger cause than personal ambitions!

Under the sponsorship of the Department of Science & Technology and with the cooperation of Bharat Vigyan

Prasar Sansthan, a contract was given to prepare a audio-video film on the Life and Works of Professor Saraf. Several versions of the film are available lasting from 20 minutes to one hour. A special function was arranged on 11 July, 2007 at the Interuniversity Accelerator Research Centre (IUAC), formerly known as Nuclear Science Centre, New Delhi, to honour

Professor Saraf in the presence of his family and distinguished guests. It was a well organized function where Professor Yash Pal came to extend an honour to this unique personality in Indian Science. It will be hard to believe in future that such a personality that lived simply but worked in a thoroughly professionally manner existed amongst us in flesh and blood. Some one called

him in 2006 as 'The Raman of Rajasthan'. May I say that his personality was unique in many ways through his transparent simplicity that radiated everything creative or innovative, enough to inspire young and old alike. I personally will remember him as academic mentor worth emulation in many ways yet unknown!

Narendra Nath
Former Professor and
Head,
Physics Dept.
Kurukshetra University 259,
Sector 7,
Urban Estate,
Kurukshetra-136118.

narendranath32@gmail.com

or

nnath32@ymail.com