Indian Journal of History of Science (2021) 56:228–229
https://doi.org/10.1007/s43539-021-00024-y

CORRESPONDENCE

A remark on the editorial "Indo-European encounter and features of modern science in pre-colonial & colonial India"

B. A. Dasannacharya[1,2]

Received: 11 December 2020 / Accepted: 23 August 2021 / Published online: 30 November 2021

Keywords BHU · Physics · History · Pre-independence

This refers to the editorial entitled "Indo-European encounter and features of modern science in pre-colonial & colonial India" published in *IJHS* 53.4 (2018) T1–T20. The editorial mentioned in the title above reviews the development of science prior to our independence. A fairly detailed account of activities in various universities is given while presenting the work on Physics. However, it seemed to the present author that some of the researches undertaken in Banaras Hindu University (BHU) during that period did not find place in the article and may be brought to the attention of the readers of *IJHS*, for the sake of completeness of the historical account.

1 Physics at BHU before 1947

The Banaras Hindu University was started in 1916 on Vasant Panchami day. Physics Department there was a teaching department till 1932 when Balebail Dasannacharya, my father, joined and started research activity. An account of work done in Physics Department, BHU before independence is mentioned below.

Balebail Dasannacharya did BA (Hons.) in Physics of Madras University from St. Joseph's College, Trichy, standing first in Madras Presidency. This degree was upgraded to MA after a year, following the rules of the Madras University at that time. As he did not get a job, he did an year's course in organic chemistry from St Xavier College, Bombay and joined Indian Institute of Science (IISc), Bangalore for research in alcoholisis with Prof. Sudborogh. He published a couple of good papers and was awarded Membership of IISc.

Then he went to Munich on a scholarship to work under Nobel Laureate Prof. W. Wein and completed his D. Phil in 1925 with great distinction (*magna cum laude*) on 'Canal Rays' also called positive rays in English literature, followed by post-doctoral work in London with AW Porter, FRS and in Chicago under Arther H Compton (of Compton Effect).

He returned to India around 1930 as Professor of Physics in Islamia College, Lahore. On a call given by Pandit Madan Mohan Malviya to Indians to join Banaras Hindu University, which was a 'truly Indian university '(with little or no support from the British govt!), he joined BHU on a lower salary of about 30%, in 1932. It may be noted that earlier Physics Department at BHU, was basically teaching Department for the first sixteen years or so.

B. Dasannacharya, by training in Europe (Germany and England) and USA, brought in a perspective which included attitudes of three western countries. Thus, right from the beginning, he decided to introduce two things. One was to start research activity in Physics even at Master's degree level, though no research fund was available. The other was to start a physics museum as, after visiting physics museums at Munich and Chicago, he was convinced of educative value of the same. I have written briefly about this in *IJHS*, 53.2 (2018): 241–244. While inaugurating this physics museum on 20th January 1942, C V Raman declared, "Dr. Dasannacharya is a pioneer in this line and he has, by creating his museum, done a distinct and valuable service to physics. I am quite convinced of it."

Starting experimental work in areas of positive rays or X-rays, which were his expertise from Munich and Chicago, would have required money and time. Therefore, he initiated research work with MSc students who were given meaningful projects as part of their experimental course. This was common in Germany then. Two of the projects, for example,

✉ B. A. Dasannacharya
adasannacharya@gmail.com

[1] 4 Beach Resort Society, Sector 10A, Vashi, Navi, Mumbai 400703, India

[2] Mumbai, India

were with home-made Foucault Pendulum (of interest in Astronomy) and Geiger-Mueller counter (of relevance to radiation/nuclear physics).

First results on a home built Geiger-Mueller counter was published in August 1936 with G. S. Rao (*Nature*, 138, 1936, p. 280). This was followed by two full length papers in *Philosophical Magazine*, London, one with T. S. Krishna Moorthy (serial 7, vol. 23, April 1937, pp. 609–620) and another with Amar Chand Seth (serial 7, vol. 27, February 1939, pp. 249–257. All co-authors were students of MSc course and the papers were the result of projects completed by them. Foucault is well known for his long pendulum to prove the rotation of earth. These pendulums have to be several tens of meters in length for accurate studies. There was interest in shortening the length of Foucault pendulum so that related studies on earth's rotation can be made inside a regular laboratory. The shortest pendulum in the world (of 95 cms) was built and studies undertaken with D. Hejmadi and Balram Singh Gautam resulted in three full length papers in *Philosophical Magazine*, London (ser.7, vol. 23, January 1937, pp. 65–88; ser.7, vol. 25, April 1938, pp. 601–622 and ser. 7, vol. 30, April 1940, pp. 151–160).

A third problem of contemporary relevance was construction of good mirrors for astronomical optical telescopes. This could be addressed in a university laboratory with modest financial input. A reliable method of coating silver was developed with Amar Chand Seth (*Phil. Mag*. Ser.7, vol. 26, December, 1938, pp. 249–257). This found appreciation in *Scientific American*, 163, July, 1940, p. 33 and I quote, "In sum, I consider that the improvements in silvering made in India not only save chemicals, but that **the process works clean and precise as compared with the one described in the Bureau of Standards circular quoted in ATM**." (highlighting mine). It was soon after this time that mirrors for telescopes started being coated using vacuum evaporation and silvering went out of practice. Nevertheless, it was a matter of personal satisfaction and pride for me that an Indian university invented a method to produce the world's best in its class.

Now I come to the last subject, namely, studies using discharge tubes to produce Canal rays and their interaction with gases. First, he personally trained a local person, Shivnath to do the required glass blowing for producing discharge tubes and other glass apparatus, put them together and the first measurements were published in *Current Science* (vol. 10, no.3, 1941) with C. Dakshinamurti on arc discharge in mercury. Doppler effect in Hydrogen positive rays was reported with G. K. Das in *Nature*, (154, July, 1944, p. 21) and Ionisation potential and Doppler effect in Hydrogen positive rays was discussed with C. Dakshinamurti in *Nature* (154, July, 1944, p. 22). In this series Gopi Krishna Das did his DSc on Optical analysis of Canal rays and the work was reported by Dasannacharya and Das in *Phil. Mag*. (Ser.7, vol. 39, December, 1948, pp. 966–977). The work along this line and others like construction of a van de Graaf machine and NMR spectrometer formed the subject matter of doctoral work of Ms. M. Shakuntala, Ms. Sitakumari, (two early women scientists doing PhD), K. Subuddhi and R.P. Gupta after independence.

I am not sufficiently aware of other research activities in Physics Department except that of Rango Krishna Asundi who joined the Department around 1939 and started work on molecular spectroscopy. R. K. Asundi, after his PhD from London joined Aligarh Muslim University in 1931 as a Reader. He established a spectroscopy laboratory (with R. Samuel?) and published a number of papers with R. Samuel and others. When Samuel returned to Israel in 1938, Asundi's term also came to an end there. He then moved to BHU and established a good laboratory for doing molecular spectroscopy. From 1941 onwards, he and his students including D.D. Pant, Nand Lal Singh, M.R. Padhye, P. Venkateswarlu and others published a dozen papers till independence in *Nature*, *Current Science*, *Indian Journal of Physics* and others. This continued post-independence till his retirement in 1955. A complete list of this can be found in *Biographical Memoires* of Fellows of INSA, New Delhi, vol. 11 (1982) by N. A. Narasimham.

2 Remarks

In connection with the theme of "Emergence of modern science in colonial India", I wish to bring two points to attention. One is the direct influence of British rule through establishment of institutions like colleges, universities and various Surveys of India and through Indian response by creating Indian research institutes like IACS and IISc. This is well represented in the special issue of *IJHS*. The other is through indirect influence from people trained abroad but outside British isles. Balebail Dasannacharya, who was trained for his DPhil in Germany and was influenced by American system brought this latter perspective to teaching and research. The emphasis on creation of indigenous instruments for experimental research projects at Master's level and above and establishing the first (partially interactive) Physics museum in India were a reflection of this fact. Not surprisingly, this had a weaker influence in British India!