Proposals for Development of Science Teaching at Presidency College : 1888–1889

Ladli Mohon Raychaudhury*

During the early years of the Presidency College, students were taught various subjects. I.A. and I.Sc. were unknown in those days. Boys preparing even for the F.A. (First Arts) examination were required to have some basic knowledge in Mathematics, i.e., Arithmetic, Algebra, Geometry, Trigonometry and Conic section, and Physics and Chemistry. However, the B.A. course was divided in 1872 into two distinct courses—A and B, the latter being the equivalent of the present-day B.Sc. course. An interesting feature since this restructuring of the courses was the avidity with which students of the Presidency College opted for the Science stream in the B.A. examination. It was then hotly debated whether A and B were really comparable courses of study and whether the Science course was not stiffer than the literary. But one thing is clear. For the first fifteen years or so of the institution of the diversified courses of study, the better students preferred Science to Arts.[1]

The increased demand for higher studies in science began to be felt since 1874 when the college shifted to its new building. The construction of the new building not only meant relief to the congested classes but also paved the way for expansion of scientific studies. It may be noted in this connection that the teaching of Western science was one of the ideals set forth by the founders of the Hindu College. But the ideal could not be fully realized for lack of suitable laboratories. Also, there was some lack of initiative on the part of teachers who had seldom come forward with a concrete programme for improvement of science education in the college. Of course, financial constraint was always a bar to such development programmes. When the Presidency College was thought to have outlived its usefulness with the establishment of some private colleges in Calcutta, it was also felt at some quarters that not much of public money should be spent for the Presidency College alone. But such hesitations did not last long and the attitude of the Government as reflected in the Director of Public Instruction's report (1888) was very emphatic. The Presidency College "must be strengthened" to its full requirements even though it might mean neglect elsewhere. The Director further held :

> "This College was intended mainly for teaching Science and the Honours Course, and from this point of view, it was a unique institution in the country."[2]

The suggestion is quite clear—there should be no dearth of money for the development of the college.

The Government decision that the college must be strengthened had encouraged some of the young teachers of the institution, Alexander Pedler and Jagadish Chandra Bose for example, who had drawn up detailed schemes for the improvement of science teaching including the expansion of science laboratories in the Presidency College. A brief account of the origin and fate of these projects is given below. The data have been collected from a bunch of letters available in two Government of Bengal, Education Department files, nos. 100/1889 and 110/1889.

The first of these projects was submitted on behalf of the Chemistry Department for an extension of the Chemistry laboratory of the College. Prof. Alexander Pedler worked out the details of the scheme and then submitted his plan to the Principal Charles H. Tawney with a request that the Principal may please contact the Engineering Department of the Government for obtaining an estimated cost of the project on the basis of which the Government may be moved through the Director of Public Instruction for an early sanction of funds for the implementation of the project. Pedler had submitted this application on 21 February 1889. But earlier, on 7 September 1888, when he was the Officiating Principal of Presidency College, he had submitted a note to the Public Works Department giving in brief the "new original works required to be carried out" in his campus during 1889-90. In this note, Pedler had explained that since the number of students in the practical classes had increased largely in recent times, there should be some arrangement to provide larger accommodation for the students

* Alumnus 1956–58 (History)

in the laboratory and as such an "additional wing is very urgently required to be added to the Chemical Laboratory" of the College. Pedler had also explained that the existing arrangement of gas supply to the Chemistry and Physics laboratories of the College appeared to be thoroughly inadequate and the pressure of gas being always very feeble, students in larger number could not be allowed to make experiment all at the same time. Pedler therefore proposed that "a new gas holder of larger dimension at an estimated cost of at least Rs.2400/-" may be immediately installed in the central laboratory of his College.

The Principal forwarded the application for renovation and expansion of the laboratory to the D.P.I., vide his letter no. 78 dated 20 March 1889. The letter contained among others the most important enclosure, namely Pedler's letter, dated 21 February 1889, containing the plan (a sketch) of such extension work. The plan indicated the provision for construction of a lofty building with a total floor space of 7225 sq. ft. and a roof of fairly wide span. The Executive Engineer, Calcutta Division, informed the Principal by his letter no. 829 C, dated 16 March 1889, that the estimated expenditure for the projected construction would be around Rs. 60,000/- (Rupees Sixty thousand).

It is interesting to note that the expansion scheme, when submitted to the Government after being properly vetted by persons in authority, failed to evoke a satisfactory response from the Government. In his letter no. 1815 dated 15 March 1889, the D.P.I. informed the Principal that "in view of the present financial position of Government it is quite useless to submit proposals for new expenditure amounting to Rs. 60,000/-" and hence the project should be abandoned.

But in spite of such a curt refusal from the D.P.I., the Principal did not like to withdraw his proposal so easily. Now that the Officiating Principal was Alexander Pedler himself, he made yet another desperate attempt to move the D.P.I to write to the Government in support of his plan. The letter which he wrote to the D.P.I. reads as follows :

No. 265.

From Alexander Pedler, Esq.,
Offg. Principal, Presidency College,

To The Director of Public Instruction.

Dated Presidency College, the 24th July 1889.

Sir,

In continuation of this office letter No. 78 dated the 20th March 1889, and of your reply No. 1815 dated the 25th March 1889, I have the honour to draw your attention to the fact that the number of students attending this College has this year increased very largely. The actual number on the rolls indeed make it urgently necessary for Government to deal with the question of providing increased accommodation for the practical work of the students in the Chemical Laboratory.

The following is a statement of the actual number of students attending the College in the years of 1887 & 1888 on July 31st and the actual number on the rolls today the 24th July 1889.

		July 31st 1887	July 31st 1888	July 24th 1889
M.A.	5th Year	29	31	45 + 6 out-students
B.A.	4th Year	83	135	149
	3rd Year	79	75	121
F.A.	2nd Year	76	153	220
	1st Year	105	111	116
		372	505	651 + 6 out-students[3]

I would beg to point out that this rapid increase in the number of students attending the College involves a corresponding increase to the fees received by the Government from the students and that as the majority of students pay Rs. 12/- a month the income of the College (paid to Government) will probably this year be about Rs. 30,000/- more than it was in 1887.

This increase in the fee receipts may perhaps be considered a justification for the present application for the extension of the Chemical Laboratory.

Judging from the numbers as they now stand in the 3rd year class, and by the average number of M.A. students in Chemistry in the College, I believe, it will be found next June that there will be at least 70 students who will

wish to take up practical Chemistry, of which at least 65 will be 4th year or B.A. students and probably 5 or 6 M.A. students. The present Chemical Laboratory has accommodation for 54 practical students only, and it is therefore very probable that a certain proportion of students will have to be refused admission to the practical Chemical Laboratory. This would I think be very greatly to be deprecated in view of the great and growing importance of practical instruction in science in the country. I have therefore the honour to ask your favourable consideration of the suggested extension of the Laboratory the plan of which I again enclose, and that you will, if you consider it desirable, forward it to Government for sanction.

I have the honour to be

Sir

Your most obedient servant

Sd./ Alex Pedler

Offg. Principal, Presidency College.

Pedler, it may be summed up, had now given twofold reasons for an extension of laboratory facilities in his college. First, he had referred to the ever-increasing number of students who could not be suitably accommodated for experiment work in a comparatively less spacious and ill-equipped Chemistry laboratory of the College.[4] Second and perhaps the most important reason advanced by Pedler was the enhanced income of the Government (on account of tuition fee receipts) and Pedler wanted to suggest that by utilising this additional revenue receipts for only two years, the Government could well meet the expenditure for the new construction of the Chemistry laboratory. But as it often happens, the Government could not be made to understand the urgency of the programme. Thus, in spite of all the previous assurances of the D.P.I. that the authority would always help the Presidency College grow strengthened in years to come, fund was not made available for the purpose. The Director had once before rejected the proposal and now even in view of Pedler's application for reconsideration of his scheme, the D.P.I. did not seem to change his opinion. Therefore, in his letter, (no. 4238, dated 2 August 1889) to the Principal, the Director wrote[5] :

"...that in the present financial position of Govt., I regret that I cannot recommend your proposal for the extension of the Chemical laboratory of the Presidency College at an estimated cost of Rs. 60,000/-".

2

Jagadish Chandra Bose had joined the Presidency College in 1884. Four years after, towards the end of 1888, he had submitted an elaborate scheme for the improvement of the Physical Science department of the College. The scheme envisaged a twofold programme: first, increasing the laboratory facilities by making it fully equipped with new furniture including some essential scientific apparatus, and secondly, constructing a new room on the main building for being used as an observatory of the College. There was also a provision in the scheme for the creation of two posts for the laboratory, a Fireman and a third Laboratory Demonstrator, whose services would be most urgently required for full utilization of the proposed renovated laboratory. The first part of this project was laid by Jagadish Chandra in his letter addressed to the Principal, dated 22 December 1888, which was forwarded by the Principal with his own comments, vide his note to the D.P.I., no. 535 dated 28 December 1888.

In his first application to the Principal, Jagadish Chandra had submitted a list of his requirements for the projected renovation of the laboratory, such as:

(a) the construction of 25 small tables, each provided with arrangements for gas and a few provided with water tanks ;

(b) an immediate grant of Rs. 1000/- (Rupees One thousand) for the construction of duplicate apparatus for the students to work with;

(c) immediate enhancement of the yearly indents of the College by about £100/- for the next three years, i.e., 1889-91;

(d) an increased annual grant of Rs. 200/- for petty expenses ; and

(e) the appointment of an additional Demonstrator.

Jagadish Chandra also explained the reasons that prompted him to submit his requirements before the Government. "It will be seen", he explained, "that the work of the Physical Laboratory

has within the last few years almost become quadrupled and the incidental expenses have risen in proportion." Hence the need for a larger allotment to meet the essential expenditure of the College. As for construction of 25 laboratory tables and buying some new apparatus for the laboratory, he explained that not only the number of students in all of the science classes of the College had largely increased, but also practical classes had been made compulsory for the degree students of Physics. In the circumstances, the existing Physics laboratory could not meet the requirements of larger number of students and hence, it was urgently felt that the laboratory should be re-equipped. As regards the need for sophisticated scientific instruments and appliances, Jagadish Chandra pointed out that although the College laboratory had a very valuable set of Electrical apparatus, it was poorly provided with "delicate instruments on Light, Heat and Accoustics". These apart, cheap duplicates of some costly apparatus, meant for the exclusive use for lecture purposes, had also to be procured for the College laboratory for the use of the students. Jagadish Chandra proposed that while some of such apparatus may be made at the College workshop, others had to be procured through the local instrument makers. A list of such instruments of each category was also submitted by him, such as the following.

In making his suggestion for purchase of some apparatus through the local instrument makers, Jagadish Chandra explained (vide his letter to C.H. Tawney, dated 15 January 1889) that "our workshop contained no appliance for good castings and for graduating and engraving scales". Hence some such apparatus had to be obtained in the open market. Besides the purchase of these laboratory items, Jagadish Chandra had also submitted a proposal for appointment of a Fireman. "As we have not got a fireman appointed for the engine", he wrote to the Principal, "a great portion of our mechanic's time is taken up in drawing the engine and keeping it in good order." In the circumstances, his services could not be fully utilized for construction of instruments for which he was particularly appointed in the College. The appointment of a Fireman would prevent such useless diversion of duties of a skilled hand. The case made out by Jagadish Chandra was highly recommended by Alexander Pedler, then the Officiating Principal of the College. He wrote to the D.P.I. (vide his letter no. 535 dated 28 December 1888) :

"I strongly urge the desirability of these requests being granted, so as to place the Presidency College in a thoroughly satisfactory position with respect to this most important branch of its

Apparatus to be made at the Laboratory :		*Apparatus to be procured through local instrument makers :*	
Sliding Galvanometer	Mathews Galvanometer	Exploring Inductor	Pohl's Commutator
Wheatstone's Bridge	Apparatus to determine variations of resistance with rise of temperature	Electrolytic Cells for Electrotyping	Rheostat
Standard Coils			Switches
Shunts			Electro-dynamometer
Telephones	Standard Cells	Periodic Galvanometer	Auxiliary Conductor
Microphones		Ballistic Galvanometer	Wiedemann's Galvanometer
Liquid Rheostats	Sir W. Thomson's Water Drop Induction Machine	Exploring Inductor	Coils for determining different constants
Absolute Galvanometer		Water Battery	Magneto-Inductor
Silver Voltameter	Photometer to determine the efficiency of Electric Lighting	Vibrating Speaker	Apparatus to prove the Electromagnetic Law
Copper Voltameter		Apparatus for determining the mechanical equivalent of heat	Press Key
Non-conducting Stand	Tuning Fork Chronograph to determine the velocities of bodies in rapid motion	Apparatus to determine the Coefficient of Induction	Apparatus to determine Self Induction
Electrometer			Electric Lamps
Watermeter	Apparatus to determine the Velocity of Sound in air and Wavelength of Sound	Apparatus to determine the latent heat of steam	Water Jet Telephone
Drying Oven			Apparatus to determine the Index of Refraction
Dip Needle	Apparatus to measure the wavelength of light		Calorimeter
Declination Circle			
Apparatus to determine the force of gravity			
Apparatus to compare Specific gravities, Moments of Inertia, and Young's Modulus of Elasticity			

work. I think I am right in stating, that if these suggestions are carried out, the Physical Science Department of the Presidency College will be quite on a par with a very large proportion of the colleges in Europe in this Department."

Simultaneously with his scheme for getting the Physics Laboratory equipped with new apparatus, Jagadish Chandra also proposed to build an observatory on the roof of the College. During the hey-day of the Hindu College, students were often taught to make astronomical observations with the help of some instruments which were kept dumped in a room of the premises since the time the glorious days of the College were gone. Jagadish Chandra restored these instruments, which included a precious gift from the Secretary of State for India, from the dump and proposed to strengthen the course of astronomical studies by setting up an observatory in the College. In his letter to the Officiating Principal, dated 22 December 1888, he therefore wrote :

"We have a splendid set of astronomical apparatus for making the most delicate astronomical determinations. The Secretary of State has recently sent us a superior Stellar Spectroscope. At present they are lying useless, and, as you are aware, owing to the peculiar atmospheric condition of Bengal, the lenses get shoiled (sic) unless they are kept constantly in use, and well cared for. I would therefore beg to suggest that a room be built on the roof for the reception and permanent fixing of the instruments of precision for astronomic observation by the advanced students".

As usual, the proposal for construction of an observatory was thought to be an expensive project and men in authority were hesitant to approve the scheme. Jagadish Chandra had, therefore, to submit the details of his scheme and convince the Government that the project was not as much expensive as it was thought to be. The text of his letter written to the Principal reads as follows :

From J.C. Bose Esqr B.A., B.Sc.
Professor, Presidency College

To C.H. Tawney Esqr M.A.
Principal, Presidency College

Dated 30th January 1889

Sir

The room it is proposed to be built on the roof of the Presidency College is meant to be an Observatory. It need not be very expensive; what is wanted is to have a small room, with movable roof. Inside the room there will be about 5 small pillars, on which the Transit Instrument and Telescopes would be permanently fixed. For accurate setting of each Instrument continuous observation of transits extending over several weeks would be required. When the correct position is once found, the instruments are to be permanently fixed. Removal of the instruments from their previous position would entail a waste of all previous labour.

I Have the honour to be
Sir
Your most obedient servant
Sd./ J.C.Bose

Principal forwarded this letter to the Director (vide no. 39, dated 30 January 1889) with the following comment:

"I believe that all candidates for mathematical honours at Cambridge have to attend a course of lectures at the observatory. It is, I submit, desirable that students of this College reading for the M.A. degree in Physics and Mathematics should undergo a similar training."

But all said, the Government still hesitated to approve the entire project of Jagadish Chandra. Carnduff, Under-Secretary to the Government of Bengal, wrote to the D.P.I.(vide no. 230, dated 12 March 1889) to inform him as to which of the various proposals for the improvement of Physics Laboratory was most urgently required for the College. Now although the Principal wrote that he would first like to purchase the laboratory tables (vide his letter no. 53, dated 26 March 1889), the Director wrote to the Secretary (no. 5679, dated 13 September 1889) that in view of higher deposits of tuition fees, Government should sanction money for the entire project of Jagadish Chandra Bose. But it was a useless exercise. Government accorded only a partial sanction for the project (vide Carnduff's letter to the D.P.I, no 321, dated 25 April 1889)—money was made available only for construction of 15 laboratory tables (as against the required 25) and employment of a third Demonstrator and a Fireman. Sanction for the purchase of scientific apparatus and construction of an observatory was kept withheld. The official

promise that the Presidency College "must be strengthened" proved to be more elusive than real.

References and Notes

1. Sengupta, Subodh Chandra, 'History of the College', *Presidency College Centenary Volume,* A Government of West Bengal publication, 1956, p.18.
2. *ibid.,* p.17.
3. The Presidency College used to admit a number of students who were not regular alumni but would come to it from other colleges to listen to lectures on some subjects, notably subjects for which other colleges could not make suitable provision. *ibid.*, p.16.
4. Pedler's figures for F.A. and B.A. students do not give any information as to how many of them were required to do laboratory work. H.E. Stapleton, former Professor of Chemistry and Principal of the Presidency College, reported that even in 1904, Third year students reading for a Pass degree were required to study only some theoretical textbooks on Chemistry. Stapleton, H.E., 'Looking Back over the Years', *The Presidency College Magazine : Centenary Commemoration Number,* 1955, p.8.
5. File of the Government of Bengal, Education Department, no. 110/1889, for the following correspondence under reference :–
   - (i) Principal's note in Form G to D.P.I., dated 7 September 1888.
   - (ii) J. C. Bose to Principal, dated 22 December 1888.
   - (iii) No. 535, dated 28 December 1888.
   - (iv) J. C. Bose to Principal, dated 15 January 1889.
   - (v) J. C. Bose to Principal, dated 30 January 1889.
   - (vi) Pedler's letter to D.P.I., dated 21 February 1889.
   - (vii) No. 230, dated 12 March 1889.
   - (viii) No. 1815, dated 15 March 1889.
   - (ix) No. 829/C, dated 16 March 1889.
   - (x) No. 78, dated 20 March 1889.
   - (xi) No. 53, dated 26 March 1889.

   Further see File of the Government of Bengal, Education Department, no. 100/1889, for :
   - (i) No. 321, dated 25 April 1889.
   - (ii) No. 265, dated 24 July 1889.
   - (iii) No. 4238, dated 2 August 1889.
   - (iv) No. 5679, dated 13 September 1889.

