INTRODUCTION

A study of women in scientific, technical and medical education in Calcutta (1947-1974.)

Prolegomenon

The Research Question

In the late nineteenth century Bengal, many committed educationists saw women’s education as the panacea of all social ills and believed that women’s education would be a primary agent of social change.¹ However, it was not so much a question of what women actually wanted, but rather how they could be modernized. In the twenty-first century, when women have already excelled as administrators, astrophysicists, geologists, mathematicians, engineers, and surgeons², then the question that still plagues one is that what explains the increasing yet relatively low participation of women in certain specific specializations when compared to males?

Education has been seen as a necessary precondition of women’s social empowerment. It is meant to contribute positively towards women’s agency, and


² Dr Debasis Bose eds. et al Ladies in Medical College in 175 years of Medical College Bengal, Commemorative Volume (Medical College Ex-Student’s Association, Kolkata,2009) p.118, See also Minutes of the Syndicate, University of Calcutta, Part III, No. 16, 1974, p.25.
to free her from passive victimhood that society often imposes on her.\(^3\) A study of women and education in Bengal particularly during the colonial period had been attempted by many scholars in the past. It is now a fairly well traversed area. Quite a lot has been written on the origins, growth and higher education of women in the pre-independence period.

The staple of such research has definitely been on the analysis of the colonial policies on the one hand, missionary and indigenous endeavours on the other hand, that promoted or thwarted women’s education all through the nineteenth and twentieth centuries. The joining of women in large numbers in the Gandhian mass movements prior to independence, the formation of political associations by women, their endeavours to set up The Bengal Women’s Education League of 1927 are areas where sustained research has lent credence to the fact that women were coming into the public space. But this ‘public space’ was a very constricted one and discrimination innate in the socio-economic set up of Indian society imposed restrictions on women’s upward mobility across all strata of society, whenever questions of higher education and professions particularly in the sciences and technical education arose which entailed relatively more investment than in the social sciences. My endeavour was to reflect on the higher educational pursuits of Bengali women, especially the city-bred, in somewhat lesser trodden fields as the core sciences, engineering and also

medicine during the first three decades of the post-independence period and also to present a detailed analysis of the policies pertaining to the higher education of women especially in the core sciences, medical and technical education undertaken at the central and state levels particularly in view of the tremendous emphasis that was put, by the then Prime Minister Pandit Jawaharlal Nehru, on science and engineering seen as a sine qua non in the nation’s development in the years after independence.

My effort, therefore, was to situate the post-colonial Bengali woman within the framework of independent India’s policies and to find out whether there was a continuity or shift from the colonial times in the social perceptions and choice of subjects with regard to women in science.

In the process, I first probed into the objectives of women’s higher education in post-colonial Calcutta and secondly analyzed what women themselves perceived about their education and their professions, in the domains of core sciences, engineering, technology and medicine in the post-independence period. It is perhaps fitting that one chooses to write on a topic such as this in the first quarter of the twenty-first century with the ‘feminist movement in full radar, but looking back around seventy years from now, it would be safe to argue that while there were definitely no organized feminist movements at that time, that gender issues merged often with the issues of nation-building, questions of women’s empowerment were still nebulous, conservative mores of society were equally strong to let women take advantage of the new age of democracy and
equality before the law that had been ushered in, yet the policy framers and society at large were beginning to become conscious of the rights of women.

As to what prompted me to this research, it may be cited, that in the post–independence period as a result of the Five Year Plans, India witnessed a development of her science policies as also the democratic pronouncements of the Indian government to guarantee equality of opportunity to the women of India in matters of education. While on the one hand I sought to analyze the different governmental policies and decisions taken to provide equal rights to both sexes, I also examined the vital question whether women did actually find an easy access to higher education and employment in the core sciences, technical and medical education as spelt out by the government; and subsequently it led me to the obvious question of their empowerment within the patriarchal family structures in the metropolis of Calcutta from the period between 1947 and 1974.

**Review of Historical Literature**

This period in the educational history of women has not been sufficiently explored although there has been a lot of scholarly work on the nature of the scientific institutions and the ideals and policies that shaped India’s science policies immediately after independence. Scholars have variously interpreted the emphasis on post-colonial science in the Nehruvian period. Historians like David Arnold have equated post-colonial science in India as ‘Nehruvian science’,
science as Nehru understood it, lauding ancient and medieval India’s contribution in science to the outer world and at the same time acknowledging the ‘great gift’ (of science and technology) of the West, without which India was ‘doomed to decay.’

The study of women in science, medicine and technology in Bengal assume greater relevance when we try to interlink the same to the politico-social and economic changes ushered in during the first three decades after the Independence. The historiography of India’s freedom movement and the growth of women’s education in India in general and Bengal in particular revealed that the entire gamut of research work had been so long on the evolution of women’s education, particularly in the primary and secondary stages as it evolved throughout the nineteenth and first half of the twentieth centuries but no attempt had been made to study the engagement of the woman in Bengal, particularly in Calcutta in the basic sciences, medicine and technical professions in the post-colonial period.

At the other end of the scale one would find a lot of research on women in the core sciences, engineering and medicine from the 1970s onwards that seemed to be a concomitant of the women’s movement world-wide, coinciding with the publication of the first Report on the Status of Women in India, ‘Towards Equality’ in 1974. Several scholars have tried to show the gaps in theory and praxis as regards women’s professional choices in the core sciences, engineering
and certain specializations of medicine even in the post-economic globalization and liberalization phase.

Karuna Chanana presented a descriptive analysis of women’s representation in higher education system in India demonstrating the latest trends in the enrolment of women in different faculties and disciplines and also attempting to locate the disciplinary choices of women in the last forty-five years at an all-India level. The trends and shifts reflected in the choices of women are compared to those of men and have been placed in the larger framework of the debate in the feminist discourse based on education and gender. In that the attempt by the author was to explain the disciplinary choices of women within the parameters of deep-rooted gender equality in a patriarchal society.

My research, however, has tried to bridge the gap in terms of time frame; in that it has sought to study the case of women in the above fields at a time when the women’s movement of the 1960s had not really taken off, when ‘gender’ questions were not articulated so as to acquire a status of their own, in short when issues related to women’s rights, could be summarily dismissed. This was also the period of WID or women in development, a time when women’s issues were part of the developmental programmes of the government. The main focus was on basic education and welfare of women. The thrust of the Committee

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Report on the Status of Women in India in 1974 was, however, on WAD or women and development - signifying the unquestionable role that a woman could play in the regeneration of the national economy and society in the post-colonial period particularly in the light of the fact that they constituted almost half of the country’s population and also because they had been granted constitutional rights of equality along with men.

It would, however, be, over-simplistic to write a dissertation that would merely analyze the role of the financial agencies in post-colonial India that were instrumental in shaping the higher educational aspirations of women.

The historiography of science institutions or science education in India either in the colonial or the post-colonial period have actually tended to emphasize more on the administrative policies of the colonial or post-colonial governments, the almost invisibility of women in these areas have never been the subject of research.⁵

Deepak Kumar in his seminal work Science and the Raj 1857-1905 (New Delhi: Oxford University Press, 1995) has explored the links between science, technology and the process of colonization in Victorian India. It deals with a study of the concept of colonial science, the scientific explorations of the colonizers, problems in science administration, science education, scientific research and the Indian response to these activities during the colonial period.

The development of science in the Indian context from the late pre-colonial to the post-colonial periods has also been well documented in a book edited by Professor Arun Bandopadhyay. It explores the encounter of European science with its Indian counterpart and also highlights some of the indigenous achievements in science from the eighteenth to the twenty first centuries. ‘Women’ find a place in it when issues on medicine and health in imperialist India are scrutinized, otherwise women scientists do not feature in the book.

Similarly in the wake of the ‘feminist movement’ of the 1960s and thereafter, while women’s issues and their veritable marginalization in certain fields of education such as the core sciences, engineering and certain branches of medicine, whether deliberately engineered or not, have been the subject of a great deal of research. There has been almost no attempt to study the growth of science education in West Bengal, or rather the city of Calcutta which had been the cradle of luminaries in science like Dr. Mahendra Lal Sarkar, Acharya Prafulla Chandra Ray, Sir Jagadish Chandra Bose, C.V. Raman and others, in the first thirty years of the post-colonial period.

Review of researches on women’s education by M. B. Buch in the post-colonial period, the dissertations of the universities of Calcutta and Jadavpur, even books by celebrated authors and feminist scholars have tended to argue for the women in science at an all-India level, the case of Calcutta has never been presented.

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Neelam Kumar has been the first to edit a volume Women and Science in India: A Reader (New Delhi: Oxford University Press, 2009) on the post-colonial engagement of women in science education at the higher levels and their careers in science. It brings together the writings of prominent Indian academics and researchers as they discuss gender and science and explore the relevance of gender theories in the context of Indian culture, society, and politics. The inevitable association with western feminism, the status of women in research and occupation in the field of science, and the challenges faced by Indian women in line with global and universal problems are investigated in detail in the collection of essays that the anthology sums up. The volume broadens our understanding of why, despite the existence of legal and constitutional equalities, women were subjected to discrimination in science. No doubt this book furnishes a metanarrative. However, in so far as micro-level studies of the states such as West Bengal are concerned, the trajectory needs to be constructed, as this work does not deal at length with the metropolis of Calcutta or the challenges faced by women in that city.

The changing status of women in Bengal has been very well documented by Jasodhara Bagchi but the time span of the period is much later than the period under my review and does not include women in the medical professions.

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7 Neelam Kumar, Women and Science in India: A Reader (New Delhi: Oxford University Press, 2009)

In Aparna Basu’s essay ‘A Century and a Half’s Journey: Women’s Education in India, 1850s to 2000’, that formed part of a larger project on the History of Science, Philosophy and Culture in Indian Civilization, however, does cover a longer time span on the growth of women’s education with emphasis on salient policies undertaken by the government as well as analysis of the five year plans, but it does not deal at length with the concerns that the women faced while pursuing such fields as the core sciences, technical and medical education in the period after independence.

The problems faced by women in a patrifocal structure by Lalitha Subramanyam, (Women scientists in the third world-The Indian Experience, New Delhi, Sage Publication, 1998) and the gender politics of science policies and education have also been dealt with by scholars such as Veena Poonacha (Uncovering the Gender Politics of Science Policies and Education, Economic and Political Weekly, Vol.40, No. 3 Jan.15-21, 2005). But these pertain more to a contemporary period, particularly the 1990s and deal with the all-India scenario.

Similarly, a recent dissertation by Debjani Banerjee, completed under the Jadavpur University, has dealt with the contribution of the female scientists of West Bengal in the first fifty years since independence. But the choice of her

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subjects is vast and varied and thus does not concentrate on the limitations that women scientists face while pursuing a career in the core sciences, engineering or medicine. Moreover as her work covers a larger time span, issues of organized women’s movements, policies of globalization and economic liberalization also feature in her thesis as the major influences that affected the course of women’s professions. As these issues were not relevant in the period under my review, hence my work would entail on those issues that assumed significance during the first thirty years since independence.

The absence of any detailed research on the progress of women in Calcutta in the core sciences, engineering and medicine in the post-independence period therefore has to address certain pertinent issues. As the nation had embarked on a path of scientific development as a key to progress and prosperity, to bring it at par with the advanced nations of the world, it was important to relate the same to the issue of women’s education as well. Secondly, the Constitution of free India had guaranteed equality to all, irrespective of caste, class and sex, naturally it’s effects on gender had to be determined. Thirdly, politically and socially the partition and the refugee problem had caused a great upheaval on both sides of the nation’s borders which was bound to cast its shadow on the gender question. In the light of all these developments, it became imperative that a study on the higher education of women in Calcutta in science and professions could be attempted; the more so as women constituted about 50%
of the total population at that time and consequently comprised a veritable proportion of the workforce of the city.

The period 1947-1974 has been marked by a paucity of documentation on the growth of science education in Bengal, the debates that took place at the level of governance, the policies formulated at the centre and their impact on the state level of policy-making and above all the establishment of a democratic society and the manner in which the future of thousands of women were going to be shaped and changed, have been somewhat ignored. Researchers have been silent on the role and participation of women in the growth of post-colonial science, technology and medicine in Bengal, particularly in Calcutta, during this period.

While traditional archives focused on correspondence and administrative records to present a picture of the development of science and scientific institutions in the colonial period, it is only in recent times that private papers and photographs of scientists and the oral interviews conducted with them have been used to reconstruct the history of the growth of science in India in the post-independence period. The idea for creating archives in the scientific institutions has been a rather recent one, originating in the national workshop on ‘Preserving Our Scientific Heritage’, in January 2008. The Saha Institute of Nuclear Physics (Kolkata) is one such institution in India to have an archive to understand the lives of the scientists, the conditions under which they worked, the political and economic environment of their times. No doubt, it laid stress on certain aspects
of research for the progress and prosperity of the country during a particular plan period and the relationships that were created between them and the large number of support staff, laboratory assistants, technicians, apprentices and the like whose fortunes were also in a way tied to the success of the experiments and the scientists who performed them. In trying to use sources of this kind, one was faced with the obvious paucity of an archive of oral history interviews of women scientists that could throw light on the complex relationship between scientific practices, social negotiations and gender in the post-colonial period scientific development in Calcutta.

**Chapterization**

This dissertation comprises five chapters with corresponding sub-sections, along with an introduction, conclusion, appendices and a bibliography. Chapter- I enumerates the colonial system of education, with emphasis on the nature and scope of female education in the nineteenth and up to the middle of the twentieth centuries. Voices of dissent against the inequalities imposed upon them by a patriarchal society and their efforts to mitigate the condition of their sisters through legislation have been well documented. A plethora of researches exist explaining the causes and concerns that brought about the urge for female education. The Christian missionaries, the earliest players in the game, took upon themselves the task of ameliorating the condition of the women in India by
educating them, although their primary aim was to proselytize. However indigenous forces represented by the educated Indian male reformers later on took up the cause of women’s education and worked towards its proliferation. But indigenous efforts in this direction notwithstanding, missionary and governmental endeavours, concentrated on the Victorian model of a ‘good mother and good wife’ paradigm while attempting to introduce the benefits of western education to women. Thus efforts to educate the Indian woman were constricted and limited in their scope and modus operandi. There was marked differentiation in the syllabi of boys and girls and it was justified on the grounds that school education would make of girls befitting companions of their husbands and good rearers of their children. An attempt to break away from the set mould was met with severe criticism as was evident in the schism within the progressive Brahmo Samaj which split over issues of higher education and employment of the Indian woman.

Extensive researches on the growth of women’s education in the colonial period, the beginning of medical education for them, have been documented very well in celebrated works of Meredith Borthwick, Aparna Basu, Bharati Ray, Geraldine Forbes the History of Science, Philosophy and Culture (PHISPC) volumes and a host of other authors. That the growth of science education in India in the colonial period was meant to keep India’s economic development under wraps
and subordinated to the needs of the British Empire is also well-known.\textsuperscript{11} Thus an overall review of the growth of education in the colonial period with particular emphasis on women’s education in Bengal and the reasons for their marginalization in the core science subjects and technical education when compared to medical education and the professions of nursing and teaching has been made in Chapter I of my thesis. This is because no post-colonial work can be studied as completely divorced from the earlier period, as the threads of continuity as far as societal responses to the demand for women’s education and the changing patterns of women’s education continued to be active even in the aftermath of independence.

Chapter –II deals with an analysis of the government policies at the Central level, with a view to understanding whether there were any pro-women policies that were formulated within 1947 and 1974, i.e., the period of my dissertation. It is of great importance that the central policies be examined in the light of the post-colonial emphasis on scientific education and promotion of research at the institutes of higher research and technical education geared to the advancement of the newly found Indian nation. It must be remembered that these policies were also a product of the political exigencies of the time. Thus for instance, while there was considerable expansion of education at all levels and a matching rise in the demand for scientific and technical education at the university stage

\textsuperscript{11} Deepak Kumar, Science and the Raj 1857-1905,( New Delhi: Oxford University Press 1995.) passim
primarily in view of the Chinese aggression in 1962 and the declaration of a state of emergency thereafter, there was virtually a drop in the enrolment levels after 1965. This happened, particularly in 1967-68 and 1968-69 as a result of the slowing down of the rate of investment, the severe control on Government expenditure and the decline in the tempo of industrial development soon after the end of the war. Government reports and publications, commissions of education, committees formulated towards the growth of women’s education, the much-celebrated five-year plans have been discussed at length to gauge the perspectives of the government policy of education and whether they contributed to the advancement of women’s education, especially higher education and advancement of their careers in the sciences. It has been observed that most of the policies regarding women’s education had limited objectives of social welfare and basic education for women and did not in that sense mark a departure from the colonial perspective, although there was the constitutional guarantee of equal rights for women which prevented overt discrimination; but it failed to bring about any revolutionary change as regards the higher educational and professional aspirations of women in science. In fact there was disjuncture between professed policy statements and prevailing ground realities. While institutional structures such as the Department of Science and Technology and other professional bodies like the Council of Scientific and Industrial Research, Indian Council of Medical Research, departmental laboratories of various ministries like the Department of Electronics, the Ministry of Science and
Technology, Department of Atomic Energy have evolved to promote the growth of science and technology in the country, very few women have been a part of these structures in senior positions. Their participation is confined to the junior level and the few women who do make it to senior decision-making positions are unable to change the essentially masculine ethos of these institutions. That scientific institutions continue to be hierarchical in post-colonial India, in continuation of its colonial legacy is thus strongly argued by scholars like Veena Poonacha\textsuperscript{12}.

Chapter III focuses on the demand for higher education in the state and the city of Calcutta, particularly among the girl students in the years immediately after partition and an increasing demand for science education among them. The debates in the Assembly and the Syndicate Proceedings of Calcutta University of the time throw a good deal of light regarding the growth of scientific, technical and medical education in the state, affiliation of science subjects at the undergraduate level in the colleges and the allocation of grants for the same. It is also an attempt to assess the extent to which the advancement of learning benefitted women and integrated them in the overall scheme of educational development. Problems of employment, lack of proper infrastructural facilities in the colleges for laboratories and poor remuneration for the teaching faculty were factors that impeded the growth of science education in Calcutta and were the reasons

\textsuperscript{12} Veena Poonacha, 'Uncovering the Gender Politics of Science Policies and Education', in Economic and Political Weekly, Vol.40, No.3, 2005, pp.241
behind the failure of the government to bridge rhetoric and practice as regards the development of science in the educational institutions as well as to channelize institutional research in the growth of industries.

This chapter also highlights the achievements of women who passed from the Universities of Calcutta and Jadavpur and the Medical Colleges between 1947 and 1961 in Calcutta in the core science subjects such as Physics, Chemistry and Mathematics, Technical and Medical education while trying at the same time to emphasize that the benefits of higher education were still the preserve of a handful privileged few, who lived in the city and had access to higher education by dint of their rather privileged status. It is also true that no special reservations were provided to bring women at par with men in the sphere of higher education and the professions.

While in the true spirit of the Constitution, which had at one stroke granted equality to women in all respects, the government did not discriminate against women in higher education, there was, however, a lack of proper telescoping of the political and the social changes that had taken place in the country. Thus while in theory women had been granted equality with men, in practice the mood was still conservative. The Constitutional rights and liberties granted to women at par with men seemed to be both a boon and a bane for them as women had to compete with men from within the framework of an almost changeless, conservative society, which posed insurmountable barriers for her which could not be overcome by mere grant of constitutional equality with men.
The traditional, conservative mores were still strong and women often found it difficult to balance their newly found economic freedom and the dual responsibilities and expectations of a family life.

Chapter IV of the dissertation is effectively a continuation of the previous chapter but depicting a different time-frame, i.e., 1961-74. The sources consulted have also been more or less the same. While chapter III is a study of the higher educational scenario in Calcutta within the first two Five-Year Plans, this chapter would study the case of women scientists, doctors and engineers under the third and fourth five year plans when the issues were more or less the same but the emphasis had changed as regards women’s educational and professional priorities. This was also particularly in view of the enhanced age of marriage among women at this time and a persistent demand for technical training of post-high school standard, as opposed to the study of home economics and home management in the preceding period. Thus the sixties did not mark any departure from the previous decade with regard to higher educational concerns of women but in respect of technical education, there was an undoubtedly a quantitative increase in the number of women professionals in the engineering department as borne out by the Annual Reports of Jadavpur University of that period.

Yet unemployment among educated women along with male unemployment remained a nagging problem during the period under review. The lack of mobility among single as well as married women continued to be a major impediment in
the way of women securing more employment opportunities. As far as the science subjects were concerned, barring botany and zoology, men continued to dominate in the colleges. It was in the domains of Arts and Fine arts that there was a reversal of the position, reminiscent of the colonial period when investments in the sciences and the challenges of a career in the core sciences were deemed unprofitable and unsuitable as far as the education and career options of the daughter were concerned. Gender also continued to be a determinant as far as specialization in the medical profession was concerned, although apart from obstetrics, gynaecology and paediatrics which catered to women’s and children’s diseases, by the 1960s, women were also entering surgery, medicine, pathology, radiology, and anaesthetics. Orthopaedics, however, till today remains an exclusive male domain as it requires long hours of surgery and also physical strength, unsuitable for lady doctors, how much qualified she may be. Similarly, cardio-thoracic surgery, brain surgery also remains beyond the purview of women doctors as the demands of a ‘dual responsibility’ limits their chances of specialization in these areas even today.

While historians and social scientists have examined the nineteenth century archives in great detail to find out the relationship between science and colonialism, the effort to create accessible archives of the scientific institutions of post-colonial India has been a very recent phenomenon. An attempt to use oral resources, interviews with scientists and institution builders about their experiences of doing science have been used in few recent histories of science.
The fifth and last chapter of the work will concentrate on the oral testimonies of some eminent pioneer women scientists, engineers and doctors in Calcutta who worked and flourished in independent India. Since they were achievers of the highest degrees in their disciplines and entered the less trodden path of professions in chemistry, physics, mathematics, medicine and engineering, their lived experiences in the post-colonial India, will provide us with new inputs. This chapter will also take into account a comparative study of women in the aforesaid disciplines particularly in the threshold of the globalization period of 1991 to find out whether the socio-economic constraints imposed on women by the patriarchal society still held good in the context of the twenty-first century or whether the limitations continued to affect women in these fields long after colonialism had ceased to operate. While most of them stressed on the conducive academic environment of their times that did not discriminate women on the basis of her gender, they all were unanimous on the issue that women did not need reservations for their advancement. They wanted the entire system to be based on merit. This may, however, presuppose that the successful women of the 1950s, 60s and 70s in their academic and professional careers by virtue of their merit and an urban, educated, middle class background, were oblivious of the difficulties faced by the underprivileged women of the rural areas. The personality-based interviews of the women scientists, engineers and doctors would highlight the fact that they were silent observers rather than active participants in the entire scheme of nation building in the post-colonial era up to
1974. This very fact also explains the lack of will power among these outstanding pioneer women to protest for their rights and change the societal structure in favour of the majority of the underprivileged women. The Report on the Committee on the Status of Women in India 1974 has thus been discussed at length in this chapter and forms the exit point of my dissertation as it was the first report of its kind that actually brought out the status of women in India, irrespective of their birth, caste, creed, or place of residence and academic achievement. It highlighted the fact that although women constituted about 50% of the country’s population, their contribution in the economic development of the country constituted only a miniscule proportion.¹³

**Methodology and Select Note on Primary Sources:**


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Education Commission, 1948, Quinquennial Review on the Progress of Education in West Bengal, for the period 1947-48 to 1951-52, Report of the National Committee on Women’s Education, 1959, Annual Report 1964-65, Report of the Committee on the Status of Women in India, 1974. Although the Sibpur engineering college is situated outside Calcutta, the Commemorative Centenary volume has also been consulted since it was a pioneer institution as far as engineering education in India and Bengal is concerned. Besides these, I have also interviewed several eminent women physicists, chemists, mathematicians, engineers and doctors to present their oral testimonies on the period under study. A detailed list of the sources consulted both primary and secondary are enclosed with the bibliography.