

**DEBATES IN TECHNICAL EDUCATION: A PRELUDE
TO THE FOUNDATION OF THE INDIAN INSTITUTES
OF
TECHNOLOGY (1930-1950)**

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in partial fulfilment of the Degree of

MASTER OF PHILOSOPHY
(History of Education)

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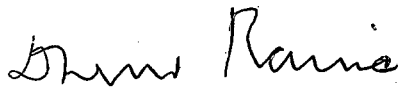
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CERTIFICATE

This is to certify that the dissertation entitled, "DEBATES IN TECHNICAL EDUCATION: A PRELUDE TO THE FOUNDATION OF THE INDIAN INSTITUTES OF TECHNOLOGY (1930-1950)" submitted by SAROJ BANGARU is in partial fulfilment of the requirement for the award of the degree of this university. This work is original, and has not been submitted so far, in part or full, for any degree or diploma of this or any other university.

We recommend that this dissertation may be placed before the examiners for evaluation.


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CHAPTER I

INTRODUCTION

The Indian Institutes of Technology* are considered to be the 'premier academic institutes for higher training, research and development in science, engineering and technology in India.'¹ Originally envisioned as Higher Technical Institutes, for the post-war industrial development of the country, these institutes are only but the latest manifestations of the development process initiated in this country during the period of British rule, and actively pursued after independence. This concern for industrialization and its deficiency, though highlighted in post-independent India, became one of the primary sites for the critique of colonial exploitation. In the process, technical education was perceived as an important instrument in the realization of the goal of industrial development, as it directly fulfilled the needs of technical manpower required by a potential industrializing nation.

The present name² Indian Institute of Technology was adopted before the

* hereafter referred to as IIT.

¹ Beri G.C. (1993). 'Research and Development in Indian Industry'.

² Prior to their formal inauguration the IIT's were called 'Higher Technical Institutes' and 'Technical' was replaced with 'Technology' while retaining the word 'Institute'. An interesting discussion by Sargent, John the Educational Adviser to the Government of India, on the nomenclature of a proposed Technical College in Bengal, and its implications is mentioned. 'The name given to a new institution is important for the purpose not only of defining as clearly as possible its status and aims but also of attracting public attention. In England technical institutions of the first rank are usually called colleges, irrespective of the question whether they are affiliated to universities or not. In India, however, the word college so far as I am aware, is limited to institutions which are directly connected with universities.' In Sargent, John. 'Memorandum on Technical Education in Bengal'. 1940. Pg 6. According to Sebaly 'it is often said that the name "Indian Institute of Technology" was derived from the Indian Institute of Science, Bangalore set up in 1909. In Sebaly Kim Patrick. (1972). 'The Assistance of four nations in the Establishment of The Indian Institutes of Technology, 1945-1970.' University of Michigan. (Unpublished Thesis). Note. 4. Pg. 13. But, the influence of the title of Massachusetts Institute of Technology on whose model it was proposed to be based cannot be discounted.

formal inauguration of the first of these institutes at Kharagpur on 8th August, 1951, by Maulana Abul Kalam Azad, the then Honourable Minister for Education. In 1956, Prime Minister Jawaharlal Nehru at the first convocation address of an IIT praised the institute as "a fine monument of India, representing India's urges, India's future in the making."³ 'The IIT's were conceived even before India won independence and as early as April 11, 1945 a twenty-two member committee headed by N.R. Sarker⁴ was constituted to consider the development of Higher Technical Institutions for the purpose of post war industrial development in India.'⁵ The Interim Report submitted by the Sarker Committee in 1946 came to the conclusion that 'the existing facilities for Higher Technical Education are inadequate both in quantity and quality to satisfy India's post war needs for high grade technologists.'⁶ As recommended by the committee the Eastern Higher Technical Institute, later IIT Kharagpur, was the first to be set up in 1950 at the Hijli Detention Camp in West Bengal with financial help from the Ministry of Industry and Supply. Nehru's vision for the future of this country, included setting up institutes like Kharagpur and consequently, with the assistance of the erstwhile Soviet Union, West Germany, United States and Great Britain a chain of IIT's was founded, at Mumbai (1958), Chennai (1959), Kanpur (1960), and Delhi (1963) respectively. Two more IIT's, one at Guwahati (1994), and the other at Roorkee on 21st Sept, 2001⁷ were inaugurated.

³ www.iitkgp.ernet.in/institute/history.php

⁴ 'N.R. Sarker was the Finance Member in the Ministry of Bengal in 1937. He was also the Chairman of the All India Council for Technical Education when constituted in 1945.

⁵ Summerfield Carol & Devine Elizabeth Mary. (eds). (1998). 'International Dictionary of University Histories.' Pg 217-219.

⁶ Interim Report of the Sarker Committee, 1946.

⁷ www.iiitr.ac.in/about/heritage/index.shtml; IIT Roorkee was first set up as the Thomason College of Civil Engineering in 1847 A.D and then inaugurated as the University of Roorkee in 1949. With the declaration as an Institute of national importance in 2001 its status changed from University to IIT.

The Indian Institutes of Technology were declared to be 'institutes of national importance' by an Act of the Parliament in 1961 thus acquiring 'independent status and the right to confer its

To be modelled on the Massachusetts Institute of Technology, the idea of the IIT was a departure from the existing structures of technical education, the university engineering colleges, and the technical schools present, and was intended to provide high grade technologists necessary for industrial development. The present study titled "Debates in Technical Education- a Prelude to the Foundation of Indian Institutes of Technology. (1930-1950)" is an attempt to historically examine the emergence of the idea of the IIT.

Significance of the study :

The IIT's are 'about the only institutes in the country which have all the basic, physical and scientific facilities required in the institutions of that calibre, while a large number of universities are in a disgraceful state of neglect. They also claim 20% of the total budget allocation to education.'⁸ Criticism of the IIT's range from its autonomous structure and status, to its relevance in the country. Contentions also exist regarding the objectives with which these institutes were set up. For some, these institutes were established 'essentially to raise the standard of engineering education, and produce first rate engineers to work in high technology areas in industry and research organizations and not as a group of laboratories with their primary focus on research and technology development.'⁹ Amidst large claims and criticisms it becomes all the more necessary to probe into the circumstances which led to the founding of these institutes.

own degrees and diplomas and to frame its own syllabi and academic policies.' in University News. Vol.1. No.3, 1963.

⁸ Times of India, 26th August, 1989.

⁹ Statesman, 20th Feb, 1987.

A doctoral thesis by Kim Patrick Sebaly on 'The Assistance of the Four Nations in the setting up of IIT's (1945-1970)' describes in detail the recommendations of the Sarker Committee Report and how the model of MIT was discussed for the creation of technical manpower. The importance of the present study resides in the fact that, there is information leading to the development of the industrial research system and the founding of CSIR, etc., but the efforts in technical education leading up to the founding of the IIT's has not been researched. This study endeavours to examine the emergence of the idea of the IIT as one strategy in India's march towards progress and self-reliance in a period dominated by both colonial repression and nationalist assertion and in the process trace the progress of technical education. In short this study is anchored in the politics of technical education.

Framework of the study :

The growth and development of technical education in India cannot be studied in isolation and has to be located within the whole educational project of the colonial administration. Official policies relating to technical and general education was conditioned by the politics of colonial expansion and consolidation of the British rule in India. And this becomes evident not only when the genesis of these systems of education is investigated, but is highlighted in the growth of the system.

The educational system according to Ambirajan, has been viewed by historians either as a 'valuable legacy' or as a tool for the metropolitan's deliberate project of exploitation. To determine whether an institution or a system is a valuable legacy or not, he poses certain questions assuming an economic rationality. 'Did the institution built (or the system planted) and the knowledge transferred to India through its medium become the basis for self-generating additional knowledge? Did

the knowledge thus acquired reduce the economic dependency of India? And did the knowledge in any way enrich the country and generate development?' On the other hand was the educational system in India solely erected for the exploitative aims of the British? To, answer such questions, according to him an institution has to be studied over a long period of time.¹⁰ He states that the claim of 'valuable legacy' as prescribed by some historians 'was an unintended outcome and can be attributed to different agencies involved in building and contributing to its growth.'¹¹

The claim of the educational system as an exploitative tool of the British, as per Krishna Kumar 'is equally untenable because it does not help us distinguish between the ideas underlying an educational system and its practical purpose.'¹² A study of the growth of technical education would show us that both agendas merge in the colonial project. If one concentrates on the 'purposes of education' the differences between the governmental and non-governmental program of technical education becomes clearly visible especially, when compared with one another.¹³ The present thesis examines the educational ideals and agendas of two 'opposing schools of thought- the imperialist school and the anti-imperialist or the nationalist school.'¹⁴

¹⁰ Ambirajan, S. 'Science and Technology in South India'. In Macleod, Roy and Deepak, Kumar (eds).(1995). 'Technology and the Raj.' Pg 112.

¹¹ *ibid.*

¹² Kumar, Krishna. (1991). 'Political Agenda of Education.' Pg 23.

¹³The Indian Industrial Commission report (1916-1918) aptly sums up the growth of technical education under the colonial project in the statement: 'in the past, the education of engineering has been too much influenced by the requirements of Public Works Department without regard to the future or to other interests in India which can be handled only by engineers. The greater part of the work done in each college is the training of upper subordinates, lower subordinates, surveyors and draftsmen.' In Crane, Robert I. (1965). 'Technical Education and Economic Development in India before World War I'. Pg 3.

¹⁴ Chandra Bipan. (1979). 'British and Indian Ideas on Economic Development 1858-1905' in 'Nationalism and Colonialism in Modern India.' Pg 83.

According to Chandra 'neither the British nor the Indian ideas on economic growth were articulated by professional economists' and the contemporary literature written on the subject 'was not economic thought or ideas but economic policies.' Describing the period from 1858-1905 as when the 'inner contradictions of British imperialism matured', and 'the emergence of the indigenous industrialist class and the nationalist intelligentsia took roots, he states that the objective basis for the two opposing schools of economic thought was provided by reality

Any examination of this conflict is useful in as much as it reflects the kind of policies that were initiated and expressed in the field of technical education, during the freedom struggle.

According to Bipan Chandra, during the second half of the 19th century, economic development was recognised as the principal 'measure of the nation's progress' and both the nationalists and the British 'developed opposing views of the barriers to economic development in India of the ways and means of promoting it, that is they developed diverging theories of economic development'¹⁵ and their differing views on this aspect is reflected in their policies on technical education. On disciplinary terms, this discussion has to be situated within the broad economic history, with specific reference to 'industrialization', as it is within this context that the issue of technical education was debated, and the changing regimes of colonial power after World War I.

	Imperialist	Anti-imperialist/ nationalist
Economic agenda	Economic colonialism	Economic self-reliance
Educational agenda	Colonial administration	Emancipatory

While recognizing the development of technical and higher technical education, as primarily a product of the 'interaction between education and industrial development'¹⁶ the study tries to establish that it is 'broached in a number

itself.' In Pg 82-83, *ibid.* In the same vein, emphasizing the analysis of the rise and fall of imperialism in its entirety, as a simultaneous phenomenon, Tomlinson B.R. states that 'growth and shrinkage of British Empire have, until recently gone hand in hand, it follows that imperialism and decolonization must be studied as a single, integrated phenomenon and that theoretical explanations based on the analysis of one half of the process must be applicable to the other.' In Tomlinson B.R. (1979). 'The Political Economy of the Raj 1914-1947.' Pg ix

¹⁵ *ibid.*

¹⁶ Fox Robert and Guagnini Anna. (eds). (1993). 'Education, technology and industrial performance in Europe, 1850-1939.' Pg 1.

of very diverse economic, political, and social contexts'¹⁷ and cannot be understood in terms of 'simple causal relationships.' According to Fox and Guagnini there was no country in Europe by the middle of the nineteenth century which had not made arrangements for the provision of technical education under the assumption that 'modernisation and the advancement of technical education' are complementary. They also state that, 'there was a marked expansion of the teaching profession at just the time when industry entered its own phase of dramatic change.'¹⁸ One dimension of the relationship between education and industry, has been explained in terms of consolidation of their mutual interests; the educationists forwarding their own as those of the industry thus pushing for 'industrially relevant courses', and the industry advancing the same for its own consolidation and therefore expansion.

The study would thus, with this understanding plot the various trajectories of the growth of technical education in India as influenced by the politics of colonialism and economic nationalism that led to the emergence of Higher Technical Institutes like the IIT's.

Defining Technical Education :

Technical education is imparted at three different levels in India; the Industrial Training Institutes (ITI), which conduct trade courses for skilled workers; Polytechnic¹⁹ Institutes, diploma courses to produce middle level technicians, and Engineering colleges, carry out undergraduate and post graduate courses in Engineering and Technology respectively.²⁰ Though the first two levels stated, are

¹⁷ *ibid.*

¹⁸ *ibid.* Pg 2.

¹⁹ 'A Polytechnic conducts full-time Diploma Courses in Civil, Mechanical and Electrical Engineering.' in Chandrakant L.S. (1971). 'Polytechnic Education in India.' Pg 21.

²⁰ Chandra, Nimesh. (2003). "Academia-Industry Interface in Technology Commercialisation- A Case Study of IIT Delhi.' M.Phil, CSSP, JNU (Unpublished Thesis).

generally, associated with the term technical education, and the third comprises technological education, this hierarchy illustrates the ever-increasing scope of 'technical education'. A study of the different definitions of technical education provided, reveals the manner in which these words came to represent a different kind of knowledge, demarcating its scope by distinguishing it sharply from liberal education; and also in the process, differentiating into a continuum ranging from industrial to technological education.

According to Daniel Headrick "technical education" covers a spectrum of activities, and their meaning has changed over time to cover every sort of work-oriented learning.²¹ Presenting a review of the different meanings of technical education in the west,²² Ghosh J.C. offered the German definition to be 'the study of the principles underlying every kind of human craftsmanship.' One can observe a nascent systematisation in the definition of technical education given by 'Sir Phillip Magnus on the occasion of opening Finsbury Technical College', 'as instruction relating to one's career but can be applied only to an engineer or a chemist but not to the training of a surgeon and a lawyer.'

Examining the place of technical education in the 'indigenous Indian system of education' prior to the introduction of English Education, Ghosh J.C. pointed out that 'wealth producing education of any kind was synonymous with technical training on caste lines.'²³ The Brahminic culture constituting 'Brahmins who never sought employment but cultivated knowledge for its own sake'²⁴ was similar to

²¹ Headrick, Daniel. (1988). 'The Tentacles of Progress.' Pg 305.

²² Different meanings of technical education as given by reputed authorities is provided in Ghosh J.C. (1943). 'Technical Education.' Pg 6-8. The author was the first Director of IIT Kharagpur.

²³ Ghosh J.C. (1943). 'Technical Education.' Pg 1.

²⁴ *ibid.*

higher literary education. On the other hand, the training the non-Brahmins received 'on caste lines', to produce wealth by means of 'controlling trade and industries' could be called technical. Thus, the categorization of education associated with related vocations, the product of the structural and functional division of Indian society, into technical and non-technical, was according to Ghosh based on two factors, wealth production and employment.

Headrick presents a content based categorization²⁵ of technical education catering to different levels. The lowest level entailed imparting children in simple skills of farming and primitive rural crafts, requiring no literacy and the dissemination of skills for pre-industrial crafts such as carpentry, brick-laying, etc. The next level he calls that of vocational training and is usually again 'associated with primary education in the vernacular, included the basic skills, artistic crafts indigenous to the region; the colonial officials feared were being threatened by chief factory imports, were also taught.' He distinguishes technical education from the above as being exclusively taught in the language of the colonizers along with primary and secondary education- the training for 'such mid-level jobs in the modern sector such as surveying, typography, draftsmanship, telegraphy and machine repair. College level engineering education was even more sophisticated

²⁵ Another categorisation based on the kind of students who pursue technical education at different stages of the educational system is presented in Wood William Walter. 'The Co-ordination of Technical Education in India.' F.9-11/41 T.3. 'The school, college and the employer are the principal parties concerned with technical education and are engaged in producing young men who will be able to take their places in industry as artisans, foremen or executives. The artisan is the product of the primary school, the foremen of the junior technical school or technical high school and the executive of the university or technical college. This ordering is in no sense exclusive; a primary school boy with ability may be expected to pass the entrance examination into a technical high school and on completion of his six years course there, from the age of eleven, pass on at the age of seventeen to the engineering department of a technical college, polytechnic or university. We have, then, three types of student; the foremen type, the managerial type and the research type. Executives are drawn from both the latter groups. But each of these groups should have its own type of qualifying examination and award and each in its own group should be national in character and value.'

training, for the few sub-ordinate engineering jobs open to non-Europeans. The pinnacle of technical education was post-graduate engineering or scientific training leading to management, planning, or research positions.²⁶ This classification is useful as it gives a general picture about the diverse kind of activities and their corresponding pedagogy that is clubbed under technical education. What is pertinent in this categorization is the distinction between pre-industrial, vocational training and that technical education which is complementary to the development of industries. The highest level of technical education as described by Headrick corresponds to Ghosh's definition of technological education; being 'Highest technical tuition particularly in the application of science to manufactures, mining, agriculture and sanitation.'²⁷ and 'consists in the study of higher science in order to make it productive instead of academic and generally confined to the cramming of text book information only.'²⁸

Another feature of technical education can be discerned in the definition given at the Simla Educational Conference in 1901, which had distinguished between industrial and technical education, where industrial education was a part of technical education and 'is spoken of in some countries, particularly in America, as Trade Education or Workshop Instruction and is intended for the artisan class only, who are either incapable of understanding the underlying scientific principles whose social position and requirements preclude them from devoting the time and expense involved in the necessary theoretical study.'²⁹ One can recognize the diversification

²⁶ Headrick, Daniel. (1988). 'The Tentacles of Progress.' Pg 305.

²⁷ Ghosh J.C. op. cit. Pg 16.

²⁸ *ibid.* Pg 36.

²⁹ *ibid.* Pg 8.

of technical education not only on the basis of its content, but also to the people it was designed to cater to.³⁰

In addition to the definitions of technical education prescribed overtime, an event like the establishment of a technical institute is significant, as a valuable source to understand the evolving nature of technical education, as it provides insights into the objectives and scope of the education it intends to provide. For example while elaborating on the general aims of the proposed Delhi Technical Institute it was stated that its main aim 'will be to offer to pupils of the normal high school type an alternative form for higher education of a less academic character which will allow a greater freedom of choice both to the pupils and teachers and will comprise in the latter stages grouped courses incorporating the principles of technology and of commerce. The object will be to cultivate an interest in the wider problems of modern industry.'³¹

³⁰ 'Technical education is suited to the requirements of the artisan or the educated middle classes, or both.' *ibid.* Pg 10.

³¹ Delhi Technical Institute. Part I. F.9-11/41 T.3; According to Ghosh even an event like the establishment of an Engineering college, at Sibpur, was also not instrumental in the concretisation of the nature and scope of Technical education. It was 'vague and any educational institution which went outside the ordinary literary curriculum' constituted technical education, such as the survey or industrial schools or the Government Schools of Art were merely regarded as outgrowths with no preconceived plan or object.' in Ghosh J.C. *op. cit.* Pg 3; A major step in the delineation of the scope of technical education was taken in 1901 on the basis of 'Mr. Hill's report by creating what was then known as the bifurcation of studies in district secondary schools, which allowed a student to elect two years before matriculation whether he would take up courses qualifying for admission to the Sibpur Engineering College for eventual training as Sub-overseer or continue his studies for the University Entrance Examination.' *ibid.* Pg 5. This is also reflected in the view of Sir Edward Buck, late revenue secretary to the government of India while reviewing the whole subject of Technical education in India and in the western countries, stated that 'Instruction in trade or industrial schools should be dissociated from ordinary literary education.' *ibid.* Pg. 10; This disassociation gradually resulted in the depletion of 'the cream of the candidates' to the technical schools and in this regard an important innovation undertaken in Essex, England, by Mr. John Sargent when he was the Director of Education is cited in Wood William Walter. 'The Co-ordination of Technical Education in India.' F.9-11/41 T.3. 'During the high school period a boy can transfer to an ordinary academic high school if he decides he is not for a technical career and conversely a boy during these years can transfer from an ordinary high school to a technical high school, if vacancies exist. Previously boys were admitted at the age

Technical education emerged wedded to the idea of employment and was created as a separate branch of study different from that of liberal education intended for those who do not have any need for literary training, thus being vocational in character. Its diversifying and 'widening curriculum' has been attributed to 'on the one hand, the increasing demands on the part of industry, created not only by accentuated competition but also by the emergence of entirely new industries and on other hand to a recognition on the part of those responsible, that technical education should include the study of design and distribution as well as the actual processes of manufacture'³² and correspondingly one observes the appearance of an associated lexicon of terms like industrial, vocational, technological education.

Finally, 'technical education as a branch of education has been described as having special purpose of its own' but at the same time it has to be recognised as an integral part of the general educational system and not merely a special training for industrial employment. But, 'the primary function of technical instruction remains and is likely to remain that of satisfying the needs of industry and commerce.'³³

Structure of the Dissertation :

This study is a historical investigation of the factors that led to the establishment of the Indian Institutes of Technology. The manner, in which the processes of colonialism and nationalism shaped the principal events in the history

of thirteen when the ordinary high schools had taken the cream of the candidates two years earlier.'

³² Report of the Technical Education Committee of the Central Advisory Board of Education.1943. Pg.138 in Reports of the Committees appointed by the Central Advisory Board of Education in India. (1938-43). Pg 136-152.

³³Report of the Technical Education Committee of the Central Advisory Board of Education in India, 1943 together with the decisions of the Board thereon. Pg 3.

of technical education in India, is discussed in the chapter 'Growth and Development of Technical Education prior to 1930.' The emergence of the idea of an IIT and the demand for Higher Technical Education is entrenched in the economic history of India. How different perspectives of industrial development of the colonizer and the colonized were played out in the arena of technical education, more specifically, when did the 'MIT model' enter the discourse of higher technical education and how subsequently the existing organisational structure of the university was considered inadequate for the needs of technical education are some of the questions that have been attempted to answer in the chapter 'Tracing the Proposal for the Founding of the Indian Institute of Technology.'

The events that led to the setting up of the Sarker Committee, responsible for the recommendations that eventually resulted in the establishment of the IIT's, and what were the measures undertaken by independent India before IIT could become a reality is talked about in the next chapter 'Finalizing the idea of the Indian Institute of Technology.'

CHAPTER II

Growth and Development of Technical Education in India prior to 1930

In this chapter an attempt is made to outline the diverse forms of technical education advocated, commensurate with the conflicting aims of the educational project of the imperial government and the demands made by the nationalists in the course of the freedom struggle. Both shared the idea that there was a correlation between the growth of industry and education, and the pattern of industrial development each visualized, called for a corresponding form of technical education.

The 1813 Charter Act passed by the British Parliament made it mandatory for the East India Company to make provisions for the education of its Indian subjects and accordingly 'a sum of not less than one lakh of rupees for the promotion of a knowledge of sciences among the inhabitants of British territories in India' was allocated. The 'historical importance' of this act according to Viswanathan 'lay in the commitment enjoined upon England to undertake the education of the native subjects, a responsibility which it did not bear even toward its own people.'¹ Despite the stated focus of the education project of the company on the promotion of sciences, the education provided subsequently, was predominantly literary. The politics of consolidation and expansion of the nascent British Empire largely influenced their patronage to Oriental learning in India on the one hand, and on the other, setting up of Survey schools for example by Michael Topping in 1794 at Guindy (Madras), and Bombay in 1824. This is seen as a reflection of their

¹Viswanathan Gauri. (1989). 'Masks of Conquest. Literary Study and British Rule in India.' Pg 23; According to the author there were several factors which led to this. More important than the 'civilising mission' of the British, was the acceptance by England of the excesses committed by the Company in India and 'it sought to remedy the wrongs committed against the Indians by attending to their welfare and improvement.'

expansionist policies, and also indicates the simultaneous origin for both general and technical education in India.

With regard to technical education, Zaheer Baber states that until the end of the nineteenth century, 'England had no formal institutions imparting technical education, and engineers received their training as apprentices'² before 1880. So, when the Civil Engineering College was established at Roorkee in 1847, the absence of textbooks in engineering was solved by publishing the lecture- notes, examples and drawings, of the teachers at Roorkee, as college manuals, which were periodically revised 'thus systematising the teaching of engineering.' These books also incorporated the Indian engineering practices and were 'hailed as the most complete and satisfactory work on the subject in the English language.'³ Such experiments in India, benefited their educational efforts in England and 'the founding of formal technical institutes in the colonies provided the prototype for the subsequent framing of the state supported science model in Great Britain.'⁴

Sir Charles Wood's Despatch of 1854 makes a passing reference to the development of technical education in India when it states that "useful and practical knowledge suited to every station in life may be best conveyed to the great mass of people who are utterly incapable of obtaining any education worthy of the name by their own unaided efforts." 'By the mid nineteenth century, the influence of

² Baber, Zaheer (1996). 'The Science of Empire.' Pg. 207; To illustrate that the British were very slow in 'organizing civil engineering training through formal educational institutions' Mital points out that it was in Scotland in the University of Glasgow, that engineering education began in 1840' and the Imperial College of Science and Technology was established only in 1879. In Mital. K.V. (1986). 'History of The Thomason College of Engineering (1847-1949). Pg 17.

³ Mital. K.V. (1986). 'History of The Thomason College of Engineering (1847-1949). Pg 98.

⁴ Raina, Dhruv and Habib, S. Irfan. 'Intersecting frames: Colonialism, Nationalism and Institutionalisation of science in India' in Raina, Dhruv and Habib, S. Irfan. (eds). (2003). 'Science and Technology in the twentieth century South and South East Asia.' Vol. VII, Ch 37. in 'History of the Scientific and Cultural development of Humanity.'

utilitarian philosophy, structural damage caused by colonial administration, and imperial perceptions, led to the incorporation of state-sponsored public works as an integral aspect of governmental policy⁵, and this is manifest in the creation of the Public Works Department coinciding with the setting up of universities at Calcutta, Madras and Bombay respectively, as per the Wood's Educational Despatch of 1854. In this connection Arun Kumar, talks about the manner in which the needs of the PWD shaped the engineering courses rather than training for the higher ranks of the profession and how all the engineering colleges were called 'civil engineering colleges.'⁶ The same can be observed in the case of the Indian Telegraph Department. When it needed engineers for its establishment in 1893, Roorkee College started a course in telegraph engineering. 'Its first year was common with civil engineering but in the second year there was more emphasis on physics and electricity and less on building, roads, irrigation etc. In 1897 the engineering course was extended to three years with two branches, civil and electrical.'⁷

Failed attempts to supplement the Roorkee College can be noticed in the opening of the Calcutta Civil Engineering College at Fort William in 1856 which was eventually closed in 1864. Along with starting new colleges for instruction in engineering, arrangements were also made for conducting engineering classes within the existing colleges providing general education. For instance, in the Elphinstone Institution, Bombay as early as 1824, and around 1864 in the Presidency College Calcutta, when the previously existing civil engineering college was closed down.

⁵ Baber, Zaheer (1996). op. cit. Pg 206.

⁶ Kumar, Arun. 'Colonial Requirements and Engineering Education: The Public Works Department, 1847-1947' in Macleod, Roy and Deepak, Kumar (eds). (1995). 'Technology and the Raj.' ; The term 'civil engineering' in the 19th century stood for 'engineering for civil objectives' as against 'military objectives' and should not be mistaken for its present day meaning which 'excludes electrical, mechanical, and many other branches of engineering which have sprung up later.' in Mital K.V. (1986). 'History of The Thomason College of Engineering (1847-1949)'. Pg 16.

⁷ Mital K.V. (1986). 'History of Thomason College of Engineering (1847-1949)'. Pg 162.

Between 1847 and 1866, three major institutions, namely the College of Civil Engineering at Roorkee in the north, the College of Engineering at Madras in the south, the Civil Engineering College at Poona in the west, and the Bengal Engineering College, Sibpur in the east by 1880 were opened by the British.⁸ While the Roorkee College, mainly looked into the needs of the North- Western Provinces, the other colleges at Calcutta, Madras, and Poona were established to serve the three presidencies of Bengal, Madras and Bombay.⁹ Among these colleges, Roorkee was under the control of the Public Works Department and awarded its own degrees, while the rest were under the Department of education, and later affiliated to their respective universities.¹⁰

Efforts were also made to establish industrial schools and by the year 1884 there were in British India forty-four Industrial schools¹¹ with 1524 students. Parallel to the developments in engineering education, recommendations to state clearly the scope of technical education as against the literary education provided at the school level were made and 'the upper classes of the high schools' were to form two divisions 'one leading to the entrance examination of the university, the other of a more practical character intended to fit youths for commercial or non- literary pursuits.'¹²

⁸ Gupta S.P. (1979). 'Modern India and Progress in Science and Technology.' Pg 119.

⁹ In Mital. K.V. (1986). op. cit. Pg 18-19.

¹⁰ In 1862, the survey school at Guindy, Madras was upgraded to a collegiate department and in 1885 was renamed the Madras Civil Engineering College. 'It prepared engineers for the degrees of B.C.E. of Madras University. In 1866 the Poona Civil Engineering College got affiliated to the Bombay University for the Diploma of L.C.E., a three year course after matriculation.' In Gupta S.P. (1979). op. cit. Pg 123-124.

¹¹ These constitute schools for mechanical engineering, weaving, mining, carpentry and leather work in Sharp. (1918). 'Progress of Education in India. 1912-1917.' Seventh Quinquennial Review. Vol. I. Pg 142.

¹² Crane, Robert I. (1965). 'Technical Education and Economic Development in India before World War I.' in C. Robertson Arnold and Bowman Mary Jean. (eds). 'Education and Economic Development.' Pg 11.

The official reports which provide the primary data for the colonial efforts towards technical education in India are not only important for the statistical data given, but also for their underlying assumptions and biases embedded within them. For instance, the 'Papers Relating to Technical Education in India, 1886-1904'¹³ pointed out the unfavourable circumstances of India, as an essentially backward agricultural country where the "experience obtained from Europe is inapplicable and technical education cannot create manufacturers and merely forms the adjunct of good general education for the supply of skilled labour." One is reminded of the circular argument frequently employed 'whether technical education breeds industry, or industry calls forth technical education.'¹⁴ Further, without addressing the real reason for the economical backwardness of the country justification for the non-provision of technical education by the British was usually stated in the following terms: "there is no demand for technical education because the industries in which it could be utilized do not exist. Thus it seems unlikely that establishment of a central technical college will create or introduce new industries. The prudent way of proceeding would be to ascertain local and special wants and to provide these wants practically as they arise."¹⁵

Crane examines another recurrent theme in the official reports concerning the supposed aptitudes of the Indian students regarding technical education. The 'fact that large number of school and college students opted for literary training'¹⁶ was used as evidence to portray Indian boys' lack of interest and aptitude for technical and manual training. This according to the author was a 'cliché which fed upon

¹³ *ibid.* Pg 6.

¹⁴ *ibid.* Pg 3.

¹⁵ Report of the Indian Education Commission.1883. Pg 121. in *ibid.* Pg 11.

¹⁶ *ibid.* Pg 15.

itself.' Educational enterprise from the very beginning was combined with the provision of employment opportunities in the colonial administration and the author states that unlike technical education the literary courses were most likely to gain them respectable employment. In addition to this, another relevant aspect which B.R. Tomlinson highlights is the manner in which the colonizers' perception of what India was, determined the nature of technical education provided in this country, thus carrying the legacy of the caste system into the domain of technical education. Coupled by the 'influence of missionary enterprise which started simple rural craft schools for the children of the Christian converts to provide them with gainful employment'¹⁷ and their 'perception of the disdain of high culture towards manual work, the major task for technical education was to provide elementary training in manual crafts to those excluded from the traditional employment structure.'¹⁸ The gesture of disapproval towards manual work as an impediment to the development of technical education, a notion circulated by the British in India, doesn't hold, as is demonstrated by its existence even in the industrialized countries such as England, France, and Germany. Among the constraints experienced in these countries the 'most pervasive was cultural prejudice, expressed in values inimical to manufacturing and trade and hence also to vocational instruction.'¹⁹

According to Headrick, 'technical education is one way in which the culture of technology spreads.'²⁰ The colonizers ideas of development shaped the nature of technical education provided and thus stunted the growth of the manpower required

¹⁷ *ibid.* Pg 4.

¹⁸ Tomlinson, B.R.(1998). 'Technical Education in Colonial India.1880-1914. Searching for a Suitable boy.' In Bhattacharya. S. (ed). 'The Contested Terrain: Perspectives on Education in India.' Pg 326.

¹⁹ Fox Robert and Guagnini Anna.(eds). (1993). 'Education, technology and industrial performance in Europe, 1850-1939.' Pg 3-4.

²⁰ Headerick, Daniel. (1988). 'The Tentacles of Progress.'

for industrialization. On the contrary, the vision of the nationalists included self-reliance and accordingly technical education was given a central role. In this context Bhattacharya's discussion²¹ on Bourdeiu's concept of reproduction of knowledge is relevant. Applying the concept to an Imperial scheme he states that 'the metropolitan is concerned with the production of knowledge and the colonizers with the function of reproduction of knowledge.' How both cognitive and political authority maintain the status quo of the colonizers is also discussed. The nationalists, then by their experiments in technical education expressing their assertion for self-reliance, were aiming for the production and not reproduction of knowledge, in the process gaining cognitive authority as well. If one observes carefully the quest for political and cognitive authority were interlinked and it is during the rise of nationalism that efforts to gain cognitive authority crystallized.

The Indian National Congress founded in 1885 was from the beginning 'vocal in its demands for technical education and other aids for the growth of industry'²² but the colonial government took them into consideration, only after the arrival of Lord Curzon, and responded by setting up a conference at Simla in 1900 which 'was of little value given the colonial economic policy.'²³ But significant efforts for the development of technical education in the country were taken up in the princely administered areas and by private individuals. The Indian National Congress which came into existence in 1885, since its third session had time after time, urged the government for development of technical education and Indian Industries. An Indian Industrial Conference, from 1905 met for a number of years as an adjunct to

²¹ Bhattacharya, S. (ed). (1998). 'The Contested Terrain.' Introduction.

²² Crane.(1965) op. cit. Pg 12.

²³ Basu, Aparna (1974) 'The Growth of Education and Political Development in India 1898-1920.' Pg 81.

the Indian National Congress, and has continually urged for measures for the support of indigenous industries.²⁴

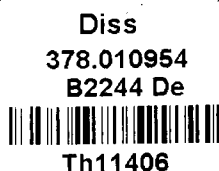
Raina and Habib state that the technical institutes in the native Indian States such as those in Travancore, Cochin, Bhavnagar, the Nizam's dominions, Gwalior, Kolhapur, Baroda etc, did not offer degrees in engineering as did the universities, but turned out a generation of lower and middle rung technicians.' Kala Bhavan was founded on these lines in 1890 by T.K.Gajjar in the State of Baroda with the assumption that the generation of technical manpower was considered a necessity for the industrial development of the area, and in the process would improve the economic conditions of the people. The Kala Bhavan set out to produce 'technicians out of artisans' by emphasizing on mechanical and chemical technical education. The emphasis on these courses according to the authors gives an 'insight into the nature of industrialization on the sub-continent.'²⁵ Scientific works were translated to Gujarati and the institute was fitted with 'the latest machinery from Britain and Germany.' Finally, 'what was accomplished was the transition from the traditional apprenticeship into the factory system.'²⁶

The period of Lord Curzon is important not only for the political events that took place but also for the developments in technical education in the country. It was during his viceroyalty that one can discern the interplay of politics and nationalism through the medium of education. 'Lord Curzon encouraged technical and industrial schools on the pretext that he was interested in providing employment to the less

²⁴ 'Technical Assistance to Indian Industry by the Government of India.' Science & Culture. Vol. IV. No.3. September, 1938. Pg 147.

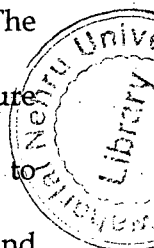
²⁵ Raina, Dhruv and Habib, S. Irfan. 'Technical Content and Social Context. Locating Technical Institutes: Two decades in the history of Kala Bhavan, Baroda(1890-1910).' Pg. 126 in P. Petitjean et al. (1992). 'Science and Empires.'

²⁶ ibid. Pg 132.



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favoured tens of thousands than a select few.²⁷ On the other hand efforts 'to organize a system of education -literary, scientific, and technical on national lines under national control'²⁸ by the nationalists were underway. Accordingly, the 'National Council of Education was set up in 1906 under the chairmanship of Satyen Tagore and was led during the early years by Satish Chandra Mukherjee.²⁹ The rising discontent of the unemployed Bengali Bhadrak, the partition of Bengal, the consequent demands of the Swadeshi movement in the field of education all culminated in the formation of the National Council of Education. The authors Raina and Habib elaborately describe how the Society for the Promotion of Technical Education set up in 1906 within the NCE, and the ideological contestations among the actors responsible for their formation regarding the form of technical education to be rendered, and the manner in which these were reflected in the setting up of the Bengal National College and the Bengal Technical Institute. 'The program they advocated embodied two images of knowledge and the processes of modernization. The members of NCE were of a liberal arts background who visualized education even on scientific and technical lines as 'a cultural transformation' while the BTI announced as its principal objective the imparting of scientific and technical education to the 'Indian people to further their industrial progress.'³⁰ The significant factor here is that both the bodies perceived the 'systematically over literary university curriculum'³¹ as deficient for the progress of the country and the 'BTI saw

²⁷ Basu, Aparna .(1974) 'The Growth of Education and political development in India (1898-1920).'

²⁸ NCE. Pg. 3. in Raina, Dhruv and Habib, S.Irfan.'Bhadrak perceptions of Science, Technology and Cultural Nationalism.' Pg 98.

²⁹ NCE p.5 in *ibid.* Pg 99.

³⁰ *ibid.*

³¹ *ibid.*

itself functioning as a body for the imparting of industrial education as had been ignored by the University of Calcutta.³²

While on the one hand we can see the existing colonial arguments stating that the absence of technical education was justified for its lack of demand³³ in the native states institutes were set up irrespective to the stage of industrialization they were in. In the colonial scheme 'industrial education of the higher type was largely provided in foreign countries'³⁴ and scholarships were awarded to Indian students by the Government to acquire this expertise. This was carried out on the pretext of paucity of facilities in India. But when there were attempts to improve the conditions of higher technical education with a "Teaching University for India" catering to the post-graduate level proposed by Jamshedji Nusserwanji Tata in 1896, Lord Curzon called it too ambitious and premature. But this institute unlike the others, was to 'initiate and promote training of Indians to excel most not when they supply a demand or a felt need, but rather when they lead the demand and stimulate a conscious perception of an hitherto unarticulated need.'³⁵ Thus the stated objectives of technical education in India contained an explicit rejection of the colonial argument that there was little demand for it. Accordingly, the Indian National

³² Benoy, Sarkar, 'Education for Industrialization.' Pg. 94 in *ibid.* Pg 109.

³³ The argument for the lack of demand for the technical trained given in one report is cited. 'The examples of England, America, Germany and Japan have been freely quoted as possessing numerous colleges and schools, and as affording various facilities for technical education and scientific industrial training. It seems to be forgotten, more often than remembered, that these countries possess a wealth of manufacturers, factories and workshops, which India does not possess, and in them, the growth of manufactures, factories and workshops, preceded the establishment of technical schools and colleges. Nevertheless, a large portion of articulate Indian opinion seems to understand that if only a sufficient number of men are trained to take up appointments as managers, foremen etc, the establishment of manufacturing concerns must follow, and the industrial regeneration of India will be assured.'³³ In Lieut. Colonel. Atkinson E.H. and Dawson S.Tom. (1912). 'Report on The Enquiry to Bring Technical Institutions into closer touch and more practical relations with the Employers of Labour in India.'

³⁴ Sharp.(1918). 'Progress of Education in India. 1912-1917.' Pg. 142.

³⁵ Subbarayappa.B.V. (1992) 'The History of the Indian Institute of Science.'

Congress, in 1900 passed a resolution expressing its 'grateful appreciation of the patriotic and munificent gift of Mr Tata for higher scientific education and research.'³⁶ This teaching university later took the form of the Indian Institute of Science, and was set up at Bangalore, in 1911. For the industrialist Tata, John Hopkins University in Baltimore, USA was the model for the proposed university. 'This university had the unique distinction for being the first university in the world which had been founded as a post-graduate institution.'³⁷ This urge for setting a university on national lines that would be both the Harvard and MIT of 1910 was evident even when the founding of the Bengal National College was proposed. In all these endeavours one can see the then existing model of the university '(a euphemism for examining bodies)³⁸ being rejected and considered unfit for imparting technical education in the country. The Calcutta University here was being perceived not only as an instrument of colonial exploitation but was inadequate in meeting the demands of technical education.

As regards the developments in technical and engineering education in the period before the World War I, according to the figures presented by the seventh quinquennial report (1912-1917) there were 283 engineering colleges and schools, technical and industrial schools with 16,594 pupils, incurring an expenditure of Rs. 28,81,077³⁹. Between 1907 and 1911, Lord Curzon referred the organisation of technical education to the provincial governments and a number of committees were appointed and schemes were suggested for the 'foundation of schools of a higher grade than the trade schools contemplated by the Government of India.' The report

³⁶ Basu, Aparna. (1974). op. cit. Pg 82.

³⁷ Subarayappa.B.V.(1992) op.cit. Pg 27.

³⁸ Raina, Dhruv and Habib S. Irfan. 'Intersecting Frames: Colonialism, Nationalism, and the Institutionalisation of Science in India.' in op. cit.

³⁹ Sharp.(1918). 'Progress of Education in India.' 1912-1917.' Pg 143.

enumerates schemes, which either did not materialize for lack of funds or were too 'impracticable.' One of the suggestions was to organize the Cawnpur Technological Institute 'as an industrial pendant to the engineering college at Roorkee' as decided by the Naini Tal Conference held in 1907. But as the trained men thus created would 'find no real place in the commercial system of the country'⁴⁰ it was abandoned. Finally in 1914 it was decided that the 'focus of the institute should primarily be on research with a view to the improvement of existing industries' but little progress was made. Eventually, World War I (1914-1918) transformed the relation between science and state, which was till then an adhoc one advocated only in the times of crises into an institutionized, rationalizing and routinizing relationship⁴¹. Bhatnagar pointed out the change of attitude of the government towards the development of industries after the war, states that 'even, the Government, whose lukewarm interest in industry had become proverbial, realised the importance of industrial expansion of India.' And in 1915 under the stress of war, the Government of India addressed the Secretary of State as follows: "after the war, India will consider herself entitled to demand the utmost help which her Government can afford to enable her to take her place, so far as circumstances permit, as a manufacturing country."⁴² As a result of this recommendation, the Government of India set up an Indian Industrial Commission under the chairmanship of Sir Thomas Holland, including amongst its members many notable Indians like Sir Fazulbhoj Currimbhoy Ebrahim, Sir R.N.Mookerjee, Sir Dorabji Taata, and Hon'ble Pt.Madan Mohan Malaviya.⁴³

⁴⁰ *ibid.* Pg 25.

⁴¹ Visvanathan, Shiv (1985). 'Organizing for Science.' Pg 41.

⁴² "The Four-fold Ruin of India." in Science and Culture. Vol. V. No.9. March, 1940. Pg 500.

⁴³ *Ibid.* Pg. 501; They pointed out to the Government that the power resource of India should be developed to the fullest extent, if India were to have her industries developed. Accordingly a hydroelectric survey of India was set up under Mr.J.W.Meares, whose three reports were published in 1922. A subsidiary committee to the Commission was formed

As per the Indian Industrial Commission appointed during the years 1916-1918, the government "realized that it was necessary to create in India the manufactures that were indispensable for industrial self-sufficiency and for national defence and that it is no longer possible to rely on free importation of essential articles in time of war."⁴⁴ The significant factor in this report is that it also highlighted the various factors responsible for the industrial backwardness of the country, and pointed out that "the education hitherto provided had been too exclusively literary in its bent" and that technical education in the form of industrial training is to be imparted which can be harnessed both as a tool for gaining employment and as manpower to the 'industries which had already reached a comparatively advanced stage of development such as textile and engineering industries.'⁴⁵

But irrespective of the recommendations of the Industrial Commission as shown by the progress of the education in India between 1917-1922⁴⁶, there was no increase in the number of institutes for higher technical education set up by the British. A few institutes for research and training in technology such as the Indian School of Mines, Dhanbad in 1926, Hartcourt Butler Institute in 1920 at Kanpur, were set up. The engineering college at Benares established in 1915 specialised in mechanical engineering, and the Jamshedpur Technical Institute set up in 1921 by the Tata Iron and Steel Company offered a three year degree course in metallurgy.

under the chairmanship of Prof. Thorpe of the Imperial College of Science, London, to consider the scheme of State co-operation in the development of heavy chemical industries recommend by the Industrial Commission. The establishment of an All-India Chemical Service was suggested to exploit the chemical resources of India.

⁴⁴ S.S.Bhatnagar. 'Scientific Research and State Aid for the Development of Industries in India.' Science and Culture. Vol. IV. No. 6. December, 1938. Pg 343.

⁴⁵ F.9-11/41 T.3.

⁴⁶ Richey. J.A. (1923). 'Progress of Education in India. 1917-1922.' Pg 160-161.

According to Crane despite these efforts most Indians who desired higher technological training had to go abroad to study.

The Interim Report of the Indian Statutory Commission published in 1929 gives an idea of the growth of vocational and technical education in India. As per the report in 'the year 1927 there were 1,911 students enrolled in the colleges of engineering and additional 1,136 enrolled in engineering schools.'⁴⁷

Thus, the promotion of higher technical education was a part of the nationalist program even from the turn of the century as is reflected in the principle events in the history of higher technical education. This included the foundation of the National Council of Education which opined that an institute based on the model of MIT should be eventually constituted, and the foundation of the Indian Institute of Science in 1909 at Bangalore with the intention of generating a demand the future. As the nationalists took centre stage in the freedom struggle so were the demands for an alternate model for education envisaged at two levels. One was the rejection of the model of the then established university and the emergence of new universities incorporating both teaching and research, previously not included in the older universities, and the founding of extra-university structures for higher technical or engineering education. This shall be discussed in the next chapter.

⁴⁷ Crane. (1965). op. cit. Pg 22.

CHAPTER III

Tracing the Proposal for the Founding of the Indian Institute of Technology

The demand for an institute on the lines of an IIT emerged prior to independence as a part of the nationalist effort directed towards the setting up of facilities for higher technical or technological education that would create technologists and engineers vital to the development of the nation. These engineers would be the pioneers who would shoulder the industrial development of the country. The principal focus of this chapter is to understand and locate the emergence of the idea of an IIT, and to outline the context within which the events leading to its establishment occurred.

Robert Fox and Anna Guagnini talk about two phases in the growth of technological education in Europe. The earlier phase involved the establishment of colleges for the creation of manpower 'to serve in the Army and both private and public sectors of mining and construction'¹ in and around the middle of the nineteenth century. The next phase was designed 'specifically to prepare technical employees for posts in manufacturing'² in the second half of the nineteenth century. Around the same time, in the colonies of these countries like India, a token system of engineering comprising industrial and engineering schools as survey schools, mainly to fill the subordinate positions of the Public Works Department was established. In the first stage, if the idea of creating a Higher Technical institute was a reaction to 'this token system of engineering,' the second stage commencing after the 1930's saw a genuine demand for the second type of establishment with its emphasis on

¹ Fox Robert and Guagnini Anna (eds). (1993). 'Education, technology and industrial performance in Europe, 1850-1939' Pg 1.

² *ibid.*

industrial production and manufacture.

The conflict between the two stages of growth of engineering education was resolved in different ways. For some it resulted in the incorporation of the older traditions of civil engineering as in the case of Belgium, Sweden, and the Italian states before unification. 'Completely separate structures had to be created'³ in France and Spain, on the other hand, to make way for the organization of the new phase of engineering. In India too, separate structures were established, as the existing institutions were perceived as instruments of colonial power or were too outdated for the project of industrial development.

The present discussion on higher technical education is embedded within the economic history of India. This section argues that the demand for higher technical education was an important constituent of the emerging national movement based on the understanding that abject poverty afflicted the country as a consequence of the exploitative colonial rule and only economic development with the help of industrialization would stimulate the growth of the economy. It is within this context that technical education came to acquire significance in the national movement.

I

Bipan Chandra's⁴ discussion on the rise of economic nationalism shows how from the period 1858-1905, i.e. the decades following the revolt of 1857, an analysis of the economic conditions under colonial rule provided the basis for the development of a critique of the imperial policy. The initial belief in the inherent goodness of the British rule, gave way to introspection in the 1870's when India was struck by a series

³ Fox Robert and Guagnini Anna (eds). (1993). 'Education, technology and industrial performance in Europe, 1850-1939.' Pg 4.

⁴ Chandra Bipan. (1969). 'The Rise and Growth of Economic Nationalism in India.' Ch I and II.

of famines. The critique of the British rule emerged in explaining the reason for the abject poverty of the Indian masses and how the British contributed to it. And it was, according to the author, the 'poverty problem' that occupied centre stage in Indian politics in the formative period of Indian nationalism.⁵ This involved firstly, proving the existence of poverty, and countering the colonial arguments that included, inheriting a backward economy, persistence of structural differences that could not be rectified by the British, or a 'happy and contented peasantry' whose wants were few. For the nationalists winning the debate entailed an acknowledgment by the British that their very presence was detrimental to the country.

The device most frequently employed by the nationalists to expose the extent of poverty in India was 'average per capita income used for the first time by Dadabhai Naoroji.' By contrasting this statistic with the industrialized countries and other better off colonies what was revealed were comparisons⁶ indicating how unfavourably India figured. Secondly, the establishment of the extent of poverty was not an end in itself; it was also necessary to determine that the economic condition of the people was declining rapidly. The identification of the causes for this extreme poverty resulted in suggestions seeking its alleviation. And it is here wherein industrialization came to be promoted as a prominent solution by the nationalists.

Among the factors listed by the British as causes for the growth in poverty

⁵ Tomlinson arguing against the proposition of complete economic exploitation by the British gives examples of those who benefited from the colonial rule. Like, the Gujarati textile centre of Ahmedabad who profited from the political stability provided; 'Over one-third of the increase in the taxes imposed by the British came from non-agricultural taxation such as tariffs, excise, and income-tax' and the criticism levied by the congressmen against the British about the farmers who suffered due to excess taxation doesn't hold.' Tomlinson B.R. (1979). 'The Political Economy of the Raj 1914-1947, 'The Economics of Decolonization in India.' Pg 12-14.

⁶ These comparisons given in tabular form 'threw lurid light' upon the economic condition of the people and showed that 'India is nineteen times worse off than England', or that in comparison with India's poverty, 'even the most oppressed and mis-governed Russia is prosperity itself.' In Chandra, Bipan. (1969). op. cit. Note. 78; Pg 19.

were the rising population that was rapidly outrunning the means of subsistence'⁷, 'the general thriftlessness and extravagance of the Indian people'⁸, and the overwhelming dependence of the economy on the weather. The nationalists on the other hand, countered the above by alleging that the present economic condition was not due to over population (more population also meant a more productive work force), but 'under production' a product of the colonial structures of exploitation, which divorced the people from adapting their means of production, by displacing home-grown industries. This particular interpretation of the problem of poverty played an important role in reinforcing the argument for industrialization, thus also making a case for the promotion of technical education. Among the scathing criticisms of the economic condition of the country under British rule, there was one factor in Indian economic development that figured positively with the nationalists, recognition of the growth of modern industry, and transport as a source of economic strength.

'Industrialization'⁹ with all its connotations as employed by the nationalists was inevitably equated with the economic development of the country. Bipan Chandra points out that 'rapid industrial growth was the vantage point from which the nationalists looked at and judged nearly all the contemporary economic issues.'¹⁰ Industrialization advocated included, both the promotion of small scale and large-

⁷ *ibid.* Note. 174. Pg 41.

⁸ *ibid.* Pg 45.

⁹ According to Tirthankar Roy 'India experienced three overlapping waves of change that fundamentally transformed patterns of production and consumption in the region. These were the rise of colonial rule, extension of market economy, and the rise of a modern economy based on machinery and wage labour.' The third stage corresponds to industrialization of India, which according to the author began after 1850. in Roy, Tirthankar. (2000). 'The Economic History of India, 1857-1947.' Pg 1.

¹⁰ 'The core of economic growth lay not in the development of foreign trade or means of transport, or in the capacity of the government to raise increasing revenues or to produce balanced budgets. This view led them to give their whole hearted, almost obsessive devotion to the aim of rapid industrialization.' Chandra Bipan(1969). *op. cit* Pg 748.

scale industry¹¹ and the former was never considered 'as an alternative to growth of modern industry.'¹² Believed to lead to social and cultural progress 'representing a superior and higher type of civilization,'¹³ and an inevitable process, the incessant demand for industrialization was not without an understanding of the disadvantages it accrued. Amongst the critics of large-scale, capitalist industry, the author states that the most vocal was Satish Chandra Mukherjee, the editor of the journal *The Dawn* from Calcutta.

'Paucity of capital'¹⁴ for investment in large-scale industry was considered a major factor impeding industrialization in the country. Scarcity of capital as a consequence of colonial policy, including heavy taxation, the economic drain of wealth from the country, crippled investment in the sector and the lack of technological collaboration, the 'un enterprising' nature of the capitalist class were all voiced as causes by the nationalists. We see here an interfoliation of criticism of colonial exploitation with prescriptions for industrial development. Tomlinson points out 'the lack of economic opportunities in the field'¹⁵ as the main cause of economic under development. Illustrating this by describing the economic condition in 1913 before the World War I, the author states that there could be 'no further development of Industry as it was in an equilibrium trap', and investment was only possible when 'either the supply of manufacturers from overseas had to be disrupted

¹¹ Large-scale industry unlike the small-scale industry though employs a small workforce its contribution to income is large. It also encourages the growth of infrastructure. Contrasting the two, large-scale industry is capital intensive and helps in increasing labour productivity. Where as small scale industry is labour intensive and can create employment in industry, but is not capable of generating economic development. In Roy, Tirthankar. (2000) op. cit. Chapter V.

¹² Chandra Bipan. (1969). op. cit. Pg 65.

¹³ *ibid.* Note. 69. Pg 68.

¹⁴ *ibid.* Pg 73-75.

¹⁵ Tomlinson B.R. (1979). 'The Political Economy of the Raj 1914-1947, The Economics of Decolonization in India.' Pg 12.

to allow increased demand which would enable the often speculative, under capitalized Indian factories to survive and develop, or the established institutional pattern for the allocation of savings had to be broken down. This could only result from the creation of new surpluses greater than could be handled by the indigenous industrial enterprise using local capital, or when the external network for the supply of goods and the internal network for the supply of credit were both disrupted, as was to happen in the 1930's and 1940's, only then was it likely that Indian Industrial Production would increase significantly.¹⁶

According to the nationalists another reason for the low level of industrial development was the Government's policy of supporting industrial schools, and not higher technical education required for large-scale industries. The intervention of the state was demanded to create an elaborate system of technical education. The issue of unemployment was linked with the existing university system, and the provision for technical education was conceived by both, as a way out of the crisis.

The nationalists argued that the lack of industrialization in the country provided no other alternative to the students but to avail of the university system, the supply of its graduates far exceeded the demand for the jobs created. The university came under scrutiny by the official government and Lord Curzon saw a way out by transferring attention to the development of technical education by increasing the number of technical and industrial schools present, and recommending the bifurcation of the ordinary literary schools from the technical schools to stem the increasing number of graduates passing out of universities. The discontented unemployed graduates were seen to provide the cadre for the growing swadeshi movement. The nationalists ardently demanded the provision of a 'major

¹⁶ *ibid.*

technical institute in the country with minor technical schools in different provinces'¹⁷ and 'the government of India was urged to establish five institutions like Mr. Tata's Institute of Science in the five great capitals of India.'¹⁸

Bipan Chandra refers to the foundation of the 'The Association for the Advancement of Scientific and Industrial Education under the leadership of K.C. Banerji, Surendranath Banerjea, A.M. Bose and others. Sending students abroad, helping Indian experts return home from foreign countries to start new industries, and equipping and maintaining a central laboratory at Calcutta'¹⁹ were on the agenda of the association for which Rs. 1 lakh was to be raised annually.

According to Hobsbawm there was no need in Britain for a system of technical education to usher in the industrial revolution. Further, Britain did without a state sponsored system of secondary education till until 1902. Though Britain was the pioneer of the industrial revolution, the path it followed was not considered as a model to emulate till the beginning of the 20th century. There was a marked change in the system of training for the industry and the 'old system of indenture and pupilage'²⁰ was no longer considered sufficient. Hence the existing system was, substituted by the state sponsored provision for training through a university. Hobsbawm writes that in Britain 'there were only 350 graduates in all branches of science and technology by the year 1913, when at the same time Germany had over 3,000 graduate engineers.'²¹ The countries which tried to usher in the industrial revolution subsequently, catered to creating manpower as a method to repeat the experience of the 'German chemical industry, which showed that the output of

¹⁷ Chandra Bipan. (1969). op. cit. Pg 77.

¹⁸ Note. 110. ibid.

¹⁹ ibid. Pg 79.

²⁰ Mital. K.V. (1986). 'History of The Thomason College of Engineering (1847-1949). Pg 17.

²¹ Hobsbawm. (1969). op. cit. Pg 182.

technological progress was a function of the input of scientifically qualified manpower, equipment and money into systematic research projects.²² According to Wolfgang König the 'German universities and the Technische Hochschulen'²³ are generally given the credit for producing scientific and technical manpower required for an expanding industry. The Technische Mittelschulen was the core of the heterogeneous structure of technical education initiated in Germany, which included training of technical personnel at all levels. India's modernizing classes closely observed these developments and by the end of the First World War we see references to Germany and Japan as the models to be followed for industrialization. This is evident further in the Malaviya's note of dissent to the report of the Indian Industrial Commission submitted in 1918. U.S.A also was regarded as the model, in recognition for the role of private enterprise in the development of technological education and scientific research. Examples were drawn from the 'remarkable group of charitable foundations for educational purposes endowed by her great millionaires Andrew Carnegie, J.D.Rockefeller, Guggenheim, Lick, Bartol and others.'²⁴ The nationalists drew parallels from these developments and appealed to all the rich industrialists and the like, to contribute generously to the cause of promotion of scientific research and technological education.

Regarding the developments in technical education in the 1930's and 40's attempts to establish electrical engineering departments were made at the Nagpur Government, and Sibpur Engineering Colleges, but both the schemes had to be

²² *ibid.* Pg 174.

²³ König Wolfgang. 'Technical Education and industrial performance in Germany: a triumph of heterogeneity' in Fox Robert and Guagnini Anna. (eds). (1993). 'Education, technology and industrial performance in Europe, 1850-1939.' Pg 65.

²⁴ 'The Carnegie Educational Trusts.' *Science and Culture.* Vol. I. No.5. October, 1935. Pg 215-218.

dropped due to lack of funds in 1930.²⁵ Advance in scientific research and technology, as reported in 1933-34, was mainly related to the setting up of new departments in universities, initiated by both local and official effort. For instance, the annual grant of Rs. 1lakh and a capital endowment of Rs. 15lakhs from the Raja Sahib of Jeypore towards the development of the University College of Science and Technology of Andhra University and the opening of the University Department of Chemical Technology at Bombay were reported as the prominent events.²⁶

Citing the experience of World War I which resulted in the increase in demand for skilled and semi skilled workers and transforming 'every technical institution in the country as a centre for technical training schemes,'²⁷ it was recommended by Mr. A. Abbot and Mr. S.H. Wood in 1936-37, when they visited India that Technical High Schools need to be introduced at the secondary stage of education. The establishment of these schools was considered to serve a dual purpose: as an alternative to the literary bent of secondary high schools and for the provision of formal training to the otherwise semi skilled technicians. Another important recommendation of the Abbot Wood report was for the setting up of a Technical Institute at Delhi.²⁸ During the Second World War John Sargent initiated within this institute a polytechnic, primarily for training war technicians. After the end of the Second World War Sargent advised the Government to continue supporting the polytechnic, in light of the absence of a senior technical institution in

²⁵ Government of India. 'Education in India in 1930-31.' Calcutta: 1933

²⁶ Government of India. 'Education in India in 1933-34.' Delhi: 1936.

²⁷ Bureau of Education, 'Report of the Technical Education Committee of the Central Advisory Board of Education in India, 1943, together with the decisions of the Board thereon.' 1946.

²⁸ 'New Technical Institute in Delhi.' Notes and News. Science and Culture. Vol. VI. No. 8. Feb, 1941. Pg 458-459; 'Student's Strike in Delhi Polytechnic.' The Legislative Assembly Debates. Official Report. Vol. I. (Short Notice Question and Answers). 11th February, 1946. Pg 776-782.

the capital city Delhi, also a large industrial centre. But this soon ran into problems of accreditation and precipitated in the students of the polytechnic going on a strike in 1946. Examinations were conducted for Engineering, Applied Chemistry and Commerce in the polytechnic, but potential employers did not recognize the diplomas issued. A Scheme formulated for the expansion of the Delhi polytechnic in the year 1946-47 was allocated Rs.24,27,012 as capital, as per Sargent's intention of converting this polytechnic into the Technological Department of Delhi University subsequently.

The American Technical Mission with Dr. H. Grady as its chairman visited India during April -May 1942 and submitted a preliminary report on the existing facilities that could be utilized for war production. The leading industrialists and experts of the country like Gaganvihari L.Mehta and Sir Mokshagundam Visvesvaraya promptly criticized it. The intention of the British Commonwealth in developing, expanding war production and laying the foundation of India's future industrial progress was limited to providing India, resources for repairing aircraft and ships. Interestingly the Aeronautical Engineering Department was started in 1942 at the Indian Institute of Science, Bangalore.²⁹

Post war development conveyed different meanings for the nationalists and the British administrators. Criticisms were levied against the British for the interpretation of the term, which meant the development of those industries that sprang up during the war. But, for the Indians post war development, was a comprehensive term, which would lay the foundations for the industrial development of the country after independence. Both parties recognized the importance of science and technology as a means for achieving 'self-reliance' and

²⁹ Interview with Dr. Arcot Ramachandran. Former Director of IIT, Madras. 19967-73. June 8th, 2004.

various measures were conceived for the development of technical education as an appropriate input to industrialization. Planning, coordination and organization were some of the strategies contemplated and acted upon to achieve the objective of industrial development.

II

Planning, scientific and industrial research and technological education were all issues viewed interdependently and woven together in the debates endorsing India's path to industrial development during this period. The congress made a demand for an independent state and set about organizing committees like the National Planning Committee, and the Industrial Conference. Then it commenced on a search for successful models in industrialized developed nations such as the U.S.S.R and U.S.A.

The ideas of planning in this country were initiated first by Sir. M. Visvesvaraya, 'the prominent industrialist, statesman, and economic thinker between the years 1935 and 1940 and steadfastly thereafter through the useful publications of the All-India Manufacturer's Organization.'³⁰ After contesting and winning the elections in 1937, the Congress gave concrete form to Subhas Chandra Bose's idea of a National Planning Committee in 1938 under the Chairmanship of Pandit Jawaharlal Nehru, consisting of twenty- nine sub- committees. S.C. Bose, highlighted the need for paying equal attention to the attainment of freedom and post war reconstruction³¹ and emphasized the dire necessity of an 'Industrial Revolution'³² at

³⁰ 'Planning Again.' Science and Culture. Feb, 1950. Vol. 15, No.8. Pg 293.

³¹ Address of the Congress President - Subhas Chandra Bose. Science and Culture. 1938. Vol. IV. No.3. Pg 139.

³² Talking about the nature of industrialization and its need S.C. Bose in his address stated that 'industrialization does not mean the promotion of industries for manufacturing

the pace carried out in Soviet Russia, which utilized planning as a key instrument. On the agenda of the Congress, were two important issues to be dealt with; the establishment of a National Planning Commission³³ and the future of technical education and technical research in India. Post-war reconstruction in the context of technical education, as per Bose must follow the example of Japan, and this was cited in order to get approval of a scheme to send Indian 'students abroad for training in accordance with a clear and definite plan so that as soon as they return home, they may proceed straightway to build up new industries and that technical education and technical research should be freed from governmental control.'³⁴

A separate sub-committee within the National Planning Committee was set up to look into technical education and research headed by M.N. Saha, the promoter of heavy industrialization in the country.³⁵ Sinha talks about Saha's support to the complete eradication of illiteracy amongst the population of the country as the first step in the process for industrial development. He also mentioned that Saha's interest in Gandhi's Nai Talim or the Wardha Scheme was only limited to covering the field of primary education while rejecting its vocational education scheme.

Various patterns of planning³⁶ undertaken in different countries were evoked, Russia's example featuring frequently as a favourite in the debates that the period

umbrella-handles and bell-metal plates' it is necessary for solving the problem of unemployment. In *Science and Culture*. 1938. Vol. IV. No.3. Pg 139.

³³ The Congress had realised the need for a unified industrial policy and had decided 'to appoint a committee of experts to advise the Congress Governments on industrial matters' on coming to power, and in July 1938 as a preliminary step Subhas Chandra Bose would 'convene a conference of the Industries Ministers of the seven Congress-administered provinces.' In *ibid*.

³⁴ *op. cit.* Vol. IV. No. 3. Pg 140.

³⁵ Sinha N. Jagadish. 'Technology for National Reconstruction: The National Planning Committee, 1938-39.' In Macleod Roy and Deepak Kumar. (eds). (1995). 'Technology and the Raj.'

³⁶ The debates as given in the *Issues of Science and Culture (1935-1950)* have been taken as a source for this section.

witnessed. Russia's pre-war status was compared to India's condition and the manner in which scientists and technicians were all geared to the industrial development of the country was cited as an example.³⁷ Planning had become a feature of industrially developed nations and was not just seen as a strategy typical of the socialist economy. President Roosevelt's 'Brain-trust'³⁸ was considered as an important exemplar, of the cooperation between the university, industry, scientific and technical research institutes, and experts of various fields as responsible for the 'New Deal.'

During the war years the Government of India following the recommendations of A.V.Hill in 1944, also formed a 'Department of Planning and Development with Sir Ardeshir Dalal as the Hon'ble Member-in-charge.'³⁹ Hill had 'recommended the creation of a Central Organization for Scientific Research with six research boards, covering agriculture, industry, engineering, war research, and geological and botanical surveys.'⁴⁰ It was suggested by Hill 'that all scientific research organizations and institutions under the Central Government should come under the new Department.'⁴¹ The committee recognized the 'improvement of technical skill'⁴² as a priority area. Pointing out that post-war reconstruction had been of immense importance in the developed nations like U.S.A, Canada and Australia, in India too the Board of Scientific and Industrial Research was established in 1940 for the purpose, but not a single industry was established as a result.

³⁷ 'Indian National Reconstruction and the Soviet Example.' Science and Culture. Vol. III. No.4. October, 1937. Pg. 185-188.

³⁸ 'Patterns of Planning in Different Countries.' _____ . Vol. XII. No.7. January, 1947. Pg 298; 'Planning and Prospect.' _____ . Vol. IX. May, 1944. No.11. Pg 457-462.

³⁹ *ibid.* Pg 298.

⁴⁰ Deepak Kumar. 'Reconstructing India: Disunity in the Science and Technology for Development Discourse, 1900-1947.' Osiris. Second series. Vol. 15. 2000.

⁴¹ 'Department of Planning and Development.' Science and Culture. Vol. X. No. 1. July, 1944.

⁴² 'Problems facing the Planning Commission.' _____ . Vol. XVI. No. 12. June, 1951.

Different plans were formulated during this period among them the most prominent being the Bombay Plan and the five year plan by M. Visvesvaraya, namely "Reconstruction in Post-War India." The latter recommended the creation of a 'very high grade technological institute on the lines of the Massachusetts Institute of Technology.'⁴³ The same idea was reiterated by J.C. Ghosh, the Director of the Indian Institute of Science and the President of the Association of Principals of Technical Institutions when he referred to the urgency of establishing a Higher Technological Institute. Elaborating on the geographical vastness of the country he supported the recommendations of the Sarker Committee report contemplating the eventual setting up of four such institutes. The recognition of the urgent need of a Higher Technical Institute forced the hand of planner's and the government to create the Sarker Committee to look into the matter.

Planning for post war development by the nationalists included the demand for the provision for scientific and industrial research. The necessity of coordinating the two was increasingly revealed with the experience of the Second World War in Great Britain. The impact this realization had on the university and the manner in which it led to the conceptualization of the internal structure, and curriculum, of the proposed Higher Technical Institute needs elaboration.

The proposal for setting up of the Higher Technical Institute in India was not the only measure undertaken for the program of reorganization initiated and debated prior to independence. Along with plans for sending students to U.K. and U.S.A, for training in technological education,⁴⁴ the strengthening of the teaching and research departments of the Indian universities was also on the agenda.⁴⁵ The

⁴³ 'Planning and Policy.' Science and Culture. Vol. X. December, 1944. No.6. Pg 218.

⁴⁴ dealt in detail in the next chapter.

⁴⁵ 'Scientific Education and Research in relation to National Welfare -I.' Science and Culture. Vol. X. No.8. February, 1948. Pg 313.

allotted function of the universities was to conduct fundamental or basic research. 'Senior research fellowships'⁴⁶ in universities were contemplated, for the creation of 'men of requisite outlook and caliber' to man the upcoming institutes of industrial research thus establishing a link between industrial and scientific research institutes.

Two factors contributed to the finalization of plans for the Higher Technological Institutes. Firstly, the organization of scientific research, compounded with the necessity for the Government to take an active role in the provision for Industrial research, unlike in the U.S.A. where most of this was conducted by private companies maintaining research laboratories on private funding.⁴⁷ The MIT⁴⁸ too, was a private university providing for technological education. Industrial research became an important government activity after independence, and was to be carried out by the Higher Technical Institutes. Secondly, the inherited structure of the university was considered cumbersome for the development of technological education. Over crowding⁴⁹, the examination system, the administration of a university, and especially the lack of autonomy⁵⁰ were some of the features mentioned as an impediment. The functions considered the sole prerogative of the university delegated to these new institutes, included framing its own curriculum, selection of students, and awarding its own degrees. Explaining as to why the California Institute of Technology though officially, does not call itself a university,

⁴⁶ *ibid.* Pg 315.

⁴⁷ 'Department of Scientific Research.' *Science and Culture*. Vol. XIV. No.3. September, 1948. Pg 85-91.

⁴⁸ It was the pioneer institution in making laboratory method of instruction as an indispensable educational technique. It virtually created the profession of chemical engineering. Its courses in electrical and aeronautical engineering were probably the first in the world. It was also the first technological institution to recognize and to provide for the important place of economics in the training of engineers. In 'The Massachusetts Institute of Technology.' *Science and Culture*. Vol. V. No.8. Pg. 458-462.

⁴⁹ 'University Education.' _____. Vol. XVI. No. 4, October, 1950.

⁵⁰ Interview with Dr. Arcot Ramachandran. *op. cit.*

was 'elected to serve as the President Institution of the Association of American Universities' the author states that this institution, and MIT were invited for membership previously into the association 'on the ground that the proper definition of a university is to be found on the quality and grade of the work it does in its chosen fields, rather than in the range of the fields which it happens to cover.'⁵¹ Thus we see a new conception of the university emerging with the rise of these innovative structures of Higher Technical Education.

⁵¹ Millikan A. Robert. 'The Educational Aims and Practices of the California Institute of Technology.' Science and Culture. Vol. V. No.9. March, 1940. Pg 514.

CHAPTER IV

Finalizing the idea of the Indian Institute of Technology

The Eastern Higher Technical Institute was established at the Hijli detention camp, Calcutta in 1950 and inaugurated as the first IIT in 1951 at Kharagpur. The developments in technical education leading up to this event shall be discussed in the chapter. As World War II came to an end, deliberations on post war reconstruction had become a part of the governmental discourse both in Europe and U.S.A. In India similarly, under the auspices of the British, debates on post war reconstruction had resulted in the constitution of committees and formulations of reports examining the various means by which post war development could be initiated. Secondly, directed by the immediate necessity of industrial regeneration, an important agenda for independent India, the shortage of technical manpower was an acute problem which had to be dealt with. Various strategies were adopted to resolve this shortage faced by the country, and they played a role in substantiating the objective of hastening the institutionalization of indigenous Higher Technological Institutes.

Owing to the presence of the colonial government, the impact of the Second World War on the progress of technical education in India did not result in the establishment of institutions as desired by the nationalists, which would lay the foundation for post-war development, but it became an occasion for discussing the paths to the improvement of technical education, since its deficiencies were severely highlighted during the course of the war. These debates were to have a significant impact on the organization of technical education after India acquired Independence. As will be shown the organizations in control of technical education today trace their origins to pre- independent India.

Two main drawbacks, namely, 'the lack of co- ordination and cooperation, and a systematic plan for future development'¹ were considered to be the reasons for the formation of the first all -India body on technical education. Co-ordination was important to get a handle on the uncontrolled growth during the wars, resulting in the duplication of the courses of technical education provided by the provinces, centre and private bodies. Likewise, it was also essential to 'evolve a system of technical education which could cope with the ever changing requirements of industry,'² as on this rested the future industrial development of the country. To attain the above objectives the first attempt at reorganization of technical education was brought into place by a body called "The Association of Principals of Technical institutions (India) on the lines of a similar association in Great Britain.' The idea was mooted by A.H.Pandya, the principal of the Bengal Engineering College along with John Sargent, the Educational Adviser to the Government of India. "The proposed association, would deal with all matters affecting technical education in India such as entrance qualifications, syllabi, examinations, scholarships, staff buildings, equipment, libraries, research etc."³ There was an appeal for all the principals in the provinces, the centre and private institutions to join the association with a view to formulating a national policy on 'all matters regarding technical education.' What is significant is a letter from the Director of Public Instruction, of the United Provinces showing disinterest. He wrote: 'Thomason College, Roorkee is a different proposition altogether being a civil engineering college and is of a different standing.' John Sargent sought a clarification as to why Roorkee should not be

¹ 'A note on the proposed formation of the Association of Principals of Technical Institutions (India).' F. 9-11/41.T.3. , Department of Education, Health and Lands. 1941.

² *ibid.*

³ *ibid.*

interested in the new association since the whole sphere of technical education was to be covered.⁴ We see here the interplay of conflicting interests; the preservation of autonomy coupled with the urge to maintain the hierarchy of the system of technical education as efforts towards reorganization for effective control and coordination were initiated. The APTI (India) though constituted to formulate a national policy on technical education, was hardly considered the body 'to exercise final administrative control over technical education'⁵ and accordingly, a National Council for Technical Education was mooted. This finally crystallized as the All India Council for Technical Education.

The most comprehensive and significant report recommending the overhauling of not just technical education but education offered at all levels, can be seen in the Post-War Educational Development report prepared by the Central Advisory Board of Education in 1944. This report is important, for it provided the framework for the post war reconstruction program in the field of education, and the Sarker committee report was a consequence of the recommendations of the report. A memorandum⁶ prepared by the Department of Education, Health and Lands in 1946, based on the recommendations of the CABE in 1944, carries the proposals further and provides evidence for the formation, of the University Grants Committee, the All India Council for Technical Education etc. These bodies were to coordinate

⁴ Letter from John Sargent to Powell Price. dt. Sept, 6th. 1941. in F. 9-11/41.T.3, Department of Education, Health and Lands.

⁵ Report by the Central Advisory Board of Education. 'Post -War Educational Development in India.' January, 1944. Pg 36.

⁶ 'Post - War Educational Development in India. Memorandum by Education, Health and Lands Department in regard to the report prepared by the Central Advisory Board of Education.' F. 55-1/46-E I, 1946.

university and technical education respectively, the formation of the Sarker Committee and to initiate schemes for training students overseas.⁷

The Post War Educational Development report prepared at the request of the Reconstruction Committee of His Excellency the Viceroy's Executive Council was largely said to be based on surveys conducted for a period of 6-7 years thus representing 'considerable public opinion.' Among the key issues discussed, was the subject of jurisdiction. The discussions indicate, that education up to the level of high school should remain under the control of the provinces in contrast to the 'more advanced forms of technical, commercial and art education.'⁸ This level of education was to remain under one or many central authorities and several reasons were stated for this arrangement. Exemplifying this, with the case of higher technical education, it was reasoned out that the relation between industry and commerce cannot be organized efficiently on a provincial basis. As these institutes were likely to be set up keeping in view the industrial concerns of the provinces there was a chance that the other provinces might be deprived of these educational facilities. And 'moreover if higher technical education were to remain a provincial concern, it would be an unduly heavy strain on the resources of some of the provinces.'⁹ This suggestion was strongly opposed by the province of Madras as it 'did not agree to the control of Higher Technical Education by the Centre.' A note on post war development¹⁰ gives an insight as to the reason for placing higher levels of education under the

⁷ To accomplish this task the three divisions of the Education department i.e. General, Technical, Overseas are to be placed in the charge of a Deputy Educational Adviser. And to meet the requirements of the post-war period it is proposed that the Education section would be separated from the Department of Education, Health and Lands and constituted as a separate Education Department of the Government of India.

⁸ op. cit.

⁹ ibid.

¹⁰ 'Note by Hon'ble Mr. Tamizuddin Khan and the Hon'ble Khan Bahadur Sayidur Rahman.' In op .cit. Pg 81.

jurisdiction of the centre. Citing the Cripps mission's proposals for the division of the country into many independent Dominions or States' as a possible political reality, effective organization of education then could materialize only in the above stated manner.

The priority accorded to Higher Technical Education subsequently in the post war reconstruction program was declared in the report prepared by CABE in 1944, and states that 'special attention be devoted to those branches in education which can make immediate contribution to national needs.' Interim measures proposed to 'recondition' the skilled technicians to civilian needs were taken up by the Labour and Military department.¹¹ Where a large supply of skilled technicians was essential, the education department was to be involved.

The AICTE formed in 1945 was mainly accorded an advisory status and this included the field of technological institutes. The main function was :

"to consider such immediate projects as are already under consideration by various departments of the Government of India e.g. the provision of a senior All-India Polytechnic on the lines of the Massachusetts Institute of Technology or the establishment of a Technical college for Electrical (Power) engineering, and to assign to these their appropriate place in an all - India Scheme."¹²

The Department of Power Engineering was eventually started at the Indian Institute of Science, Bangalore in 1950.¹³

¹¹'Post - War Educational Development in India. Memorandum by Education, Health and Lands Department in regard to the report prepared by the Central Advisory Board of Education.' F. 55-1/46-E I, 1946.

¹² ibid.

¹³ Interview, Dr. Arcot Ramachandran. Director of IIT, Madras. 1967-73, June 8th, 2004.

As the formation of the AICTE was pending an ad hoc committee¹⁴ was constituted to consider the establishment of technological institutes under the chairmanship of Mr. N.R. Sarker to consider the ways and means of establishing High Grade Technological Institutions in India, possibly on the lines of the Massachusetts Institute of Technology, to provide advanced instruction and training. The other members of the committee represented the interests of Business, Applied Science, Technology', etc.

According to Sebaly¹⁵ 'unofficial interest in the establishment of an M.I.T for India had turned into a governmental concern by 1943. The idea of the establishment of an 'Indian MIT' can be traced to A.V. Hill, who in his report "Scientific Research in India" stated the importance of establishing scientific institutions of a very high standard, and Sir Ardeshir Dalal's declaration immediately after his appointment that the opening of an Indian M.I.T. would be the first priority of the Department of Planning and Development. Highlighting Ardeshir's role in the establishment of the Sarker Committee Sebaly points out that Dalal pressed for the constitution of a committee before the constitution of the AICTE irrespective of its recommendations. Though the jurisdiction of the AICTE extended over the higher technical institutes its status was as an advisory body. The choice of the chairman for the committee fell on N.R. Sarker as he was associated with the field of technical education in Bengal from the late 1930's and he could influence the government's educational policies. He was later appointed as the chairman of the AICTE¹⁶, and became the finance minister of

¹⁴ F.55-1/46- E.I. 'Post-war Educational Development in India.'

¹⁵ Sebaly Kim Patrick. (1972). 'The Assistance of four nations in the Establishment of The Indian Institutes of Technology, 1945-1970.' University of Michigan. (Unpublished Thesis). Pg 17-21.

¹⁶ Government of India, Ministry of Education. (1954). 'All India Council for Technical Education. Proceedings of the 5th meeting 1950.'

West Bengal after independence.¹⁷ The Sarker Committee was constituted immediately after the visit of the Indian Scientific Mission (1944-45) constituting Sir S.S. Bhatnagar, Sir J.C. Ghosh, Prof. J.N. Mukherjee, Prof. S.K. Mitra and Prof. M.N. Saha to U.K, U.S.A. and Canada, after gathering among other things information about M.I.T that would be useful for the establishment of a higher technical institute. 'Five Industrial and financial leaders, three civil servants and four British Civil Engineering and military officers were also appointed.'¹⁸ Sebaly also shows that the decision to establish an institution on the basis of an MIT was largely determined by Dalal and A.V. Hill's recommendations and the committee only had 'the task to clarify what aspects of the model would be emulated, its number, details of its operation and the pattern of its organization.' The first meeting of the Sarker Committee was held on the 11th April, 1945, when the following resolution was passed:-

"The Committee are of the opinion that it is desirable and necessary to have not less than four Higher Technological Institutions one in the North, one in the East, one in the South, and one in the West to satisfy post-war requirements."¹⁹ 'It is imperative in view of the immediate needs of post-war industrial development that one such institution should be established at the earliest possible date.' The committee decided to set up one in or near Calcutta at an early date, and Western Institution in or near Bombay which should be started 'concurrently with the Eastern Institution or failing that as, soon after as possible.'

¹⁷ Ministry of Education. Pamphlet No.64. 'Report of the Committee on the ways and means of Financing Educational Development in India.' 1950. Pg 2.

¹⁸ Sebaly Kim Patrick. (1972). 'The Assistance of four nations in the Establishment of The Indian Institutes of Technology, 1945-1970.' Pg 19.

¹⁹ Central Bureau of Education, India. 'Development of Higher Technical Institutions in India. (Interim Report of Sarker Committee). February, 1946.; F.55-1/46- E.I. 'Post-war Educational Development in India.'

The Sarker Committee having agreed with the recommendations, appointed a sub-committee consisting of Dr. John Sargent (Convener) the Educational Advisor to the Government of India, Dr. Nazir Ahmed, Director, Cotton Technological Laboratory, Matunga, Bombay, Dr. Sir S.S.Bhatnagar, Director of Council of Scientific and Industrial Research, Dr. Sir J.C.Ghosh, Director, Indian Institute of Science, Bangalore, Mr. H. Kirplani, Industrial Adviser to the Government of India, Planning and Development Department, Dr. A.H. Pandya, Directorate- General of Munitions Production, Calcutta, and Dr. K. Venkataraman, Head of the Department of Chemical Technology , Bombay.²⁰ These members broadly categorized as the advocates of industrial progress based on heavy industrialization were also the key figures who were responsible in shaping the nature of industrial progress to be taken in the country. In his note of dissent Dr. Nazir Ahmed pointed out the fallacy of establishing Higher Technical Institutes before conducting a survey as envisaged earlier as per in the memorandum, and recommended the utilization of the existing facilities for Higher Technological Education present in the country after adequate upgrading. For him it was the university which should be playing the guiding role in the industrial development of the country. He posed the question whether Indian Universities would veer round and adapt themselves to the needs of the modern times or will they be replaced by technical institutions?²¹

These higher technical institutes were not just oriented towards providing graduate courses in engineering but offered 'facilities for post- graduate study and research in Engineering and Technology that were scarce. In addition, it was also

²⁰ *ibid*; List of members who sat in the Sarker committee in *ibid*.

²¹ Ahmed Nazir. 'Education as Helpmate to Industry.' *Science and Culture*. Vol. III. No.9. Pg 488-489.

necessary that these institutions produce research workers and technical teachers.²²

Thus provisional estimates of the budget for 1945-46 show that the allocation was of Rs. 2 crores towards non-recurring expenditure and Rs.12 lakhs was recurring expenditure for a period of eight months, this being the allocation for Higher Technical Education.²³

How the problem of shortage of technologists was solved?

The events succeeding the recommendations of the Sarker Committee of 1945 are discussed here primarily to answer the question of how the problem of shortage of technologists required by the country for industrial development, was solved before the founding of the IIT's?

Illiteracy and the large-scale expansion of technical education for the promotion of industries compounded with financial stringency were some of the problems India encountered soon after independence. In spite of this, several provisions were made to fulfill the objectives of industrial development, among them being the appointment of the Scientific Manpower Committee in 1947 'to assess the country's requirements for scientific and technical manpower.'²⁴ The committee submitted its report in 1949 with the recommendation that a provision of Rs.50 lakhs in the budget be made for the implementation of three schemes; industrial training, research training, improvement and expansion of facilities in the universities.

Various schemes were contemplated to bring the higher technical institutions not affiliated to the universities like the proposed higher technical institutes, Indian

²² Central Bureau of Education, India. 'Development of Higher Technical Institutions in India. (Interim Report of Sarker Committee).February, 1946. ; F.55-1/46- E.I. 'Post-war Educational Development in India.' Pg 6.

²³ F. 42-71/44E. Department of Education, Health and Lands.

²⁴ 'Indian Scientists on their visit to the U.K. and the U.S.A.' Science and Culture. Vol. X. No.9. March, 1945. Pg 376-378.

Institute of Science, Bangalore, Indian School of Mines and Geology, Dhanbad, under the control, coordination and supervision by AICTE. One of these involved the constitution of four regional committees in different geographical regions (a scheme which was not implemented due to the proposal to redraw regional boundaries) and a National Technical University to which these institutes may be affiliated.²⁵ A grant of Rs.25 lakhs was made to the existing Engineering and Technological Institutions. One item, which occupied prime importance in the agenda of the government, was the establishment of the Eastern Higher Technical Institute, for which during the period, the Government of west Bengal gave nine buildings. J.C. Ghosh was selected as the director, and it was hoped that the institute would start functioning from the next academic year, i.e. August, 1950.

The most important strategy used and highly debated in the years following the recommendations of the Sarker committee was the Overseas Scholarship Scheme employed by the government for the training of Indian students abroad to meet the demand for high grade technologists in the country. The origins of Overseas Scholarship Scheme can be traced to the suggestion of Sir Ardeshir Dalal²⁶, in charge of the Planning & Development Department of the Government of India set up in 1944. The development plans being prepared at the time, demanded the provision of trained manpower as there was a risk that all the plans would be held up because of this deficiency. It was considered impractical to train all the required persons in

²⁵ Ministry of Education. A Review of Education In India During 1949-50, Pamphlet No. 76. India. 1950; Ministry of Education. Report of Activities During 1949-1950 And Programme for 1950-51. Pamphlet No. 71. 1950.

²⁶ F.32-47/46 -OD I -/S9. Department of Education, 1946; 'Mr. John Sargent, the Educational Advisor to the Government, visited U.K. and U.S.A. to investigate to what extent facilities for the technical training of Indians would be available in those countries.' in 'Planning and Policy.' Science and Culture. Vol. X. No. 6. December, 1944.

India due to several reasons: these included 'over crowded universities'²⁷ compounded by the lack of adequate facilities such as, equipment required for specialized training. These were the key factors that influenced the decision to send selected post-graduate students abroad for practical training in the U.S.A. or U.K. A year at Oxford and Cambridge cost \$ 1,920 per student per annum, and all other institutions in U.K. and Switzerland had the rate of £ 400, excluding the tuition fees which was directly paid to the institutions concerned.²⁸

The Overseas Scholarship program was introduced by the previous British Government which selected scholars according to the 'specific needs of the various Ministries of the Government of India, the Provincial Governments and the Indian states Governments and not particularly with a view to manning Indian industries.'²⁹ The scholars were also sometimes sent abroad by the British, for training in subjects which could be easily arranged in India. On this pretext of unnecessary expenditure³⁰ the scheme was abandoned by the new government after independence and was

²⁷ F.32-47/46 -OD I -/S9.

²⁸ 'Overseas Scholarships. 'Starred Questions and Answers. Friday, 2nd December, 1949. Vol .IV, Part I. (28th Nov- 24th Dec) Constituent Assembly of India (Legislative) Debates. Part I- Questions and Answers, 1949. Pg 149-154.

²⁹ *ibid*.

³⁰ The Overseas Scholarship Scheme initiated by the British was criticized as "very badly managed and ill- conceived." Different measures were suggested to 'stop this colossal waste'. Proposals as to utilize this money in a constructive manner was given by citing an example of the activities of Dr. Sir Harisingh Gour, who had donated Rs. Twenty Lakhs for starting the Mahakosal University at his home town in Saugor and was substantiated by the provincial government with an additional grant of ten lakhs.' Demonstrating that by spending thirty lakhs of rupees or more, a University can be started in India the authors drew the attention of the Government of India and the Provincial Governments that their present programme of sending 1,000 Indian scholars annually to England and America for their higher education as wasteful. Estimating the cost of sending one student to the United States or Great Britain to finish his higher education as twenty-five thousand rupees per head, the total cost of sending 1000 students would come to not less than two crores fifty lakhs rupees, which would be sufficient to establish at least five universities or twenty-five existing Indian universities might have been endowed with at least ten lakhs each to establish up to date laboratory facilities and necessary improvements.' In Dr. Das Taraknath & G.J. Watumull. 'Stop this Waste.' Bombay Chronicle Weekly, September 22, 1946. In F.32-47/46 -OD I -/S9. Department of Education.

reoriented on the basis of the recommendation of the Roy committee constituted by the Indian government.³¹

The suggestions of the committee reflect an expansion of the functions of the above scheme. This entailed that the ultimate objective of sending students abroad should be to suit the future requirements of the educational institutions in the country. The program was redesigned such that, instruction particularly theoretical, would become available in India for all branches of study at universities, and technological institutions. As the facilities available for instruction and research increase, the number of overseas scholarships should be reduced correspondingly. Further, the development of technical institutions would be undertaken by providing grants for equipment and organizing refresher courses for teachers. Based on these recommendations the Government decided to revive the old overseas scholarship scheme in 1949.

An estimate³² for the overseas scholarship is given below to highlight the expenditure incurred for the purpose.

Year	Amount Spent in rupees
1945-46	10,32,172
1946-47	38,24,790
1947-48	35,28,997

The merits and demerits of the scheme as managed by the colonial and subsequently the Indian Government were debated and criticism offered.

³¹ The Committee appointed by the Ministry of Education, Government of India consisted of Dr. B.C.Roy, Dr. H.J.Babha, Dr. B.B.Dey and Prof N.K.Siddhanta. 'Roy Committee's report on Overseas Scholarships Scheme.' Science & Culture . Vol.14. No.10. April, 1949. Pg 424.

³² 'Candidates sent Abroad for Higher Studies at Government Expense.' Starred Questions and Answers. Friday, 13th August, 1948. Vol. VI- No.5. Constituents Assembly of India (Legislative) Debates. Part I- Questions and Answers, 1948. Pg. 369.

Nevertheless, the urgency of expanding the core and quality of technical education and institutes was duly emphasized keeping in mind the need for trained manpower in the country. These proposals were rationalized in terms of the savings that would accrue to the exchequer and more importantly the maintenance of the technological sovereignty of the new republic.

The discussions further revolved around the question of whether the students returning to India after training would find suitable employment or not?³³ Or whether the number of foreign qualified Indians was greatly in excess of what could be absorbed by Government or by Industry?³⁴ Whether a census of highly qualified Scientific and Technical Personnel (Indians) serving outside India has been taken, and in view of the acute shortage of these personnel in India had the Government considered recalling them or not?³⁵ The issue of employment was elaborated in the announcement that appeared in the Department of Planning & Development. The Government had decided to send 500 students abroad for training in technical subjects, directly related to various plans for post-war development. The students 'selected directly by the Central Government and the Provincial Government were

³³ 'Overseas Scholarships.' Starred Questions and Answers. Friday, 2nd December, 1949. Vol. IV, Part I. Constituent Assembly of India (Legislative) Debates. Part I- Questions and Answers, 1949. Pg. 151 ; 'The scholars under this scheme are sponsored for advanced studies abroad mainly to meet the anticipated needs of the various Ministries of the Government of India in connection with their post-war development plans. A scholar who returns, therefore, does not, have to ask for assistance to find a suitable job. Government take up the question of his employment of their own accord. The question of employment of these scholars is treated as a special case and is given high priority. If, however for any reason Government finds that the services of a particular scholar are not immediately required by them, these will be offered to Provincial Governments, Universities, Research Institutions industry and Indian states according to their requirements.' In 'Candidates returned from Abroad after completion of studies.' Monday 8th March, 1948. Vol. III. No.2. Constituent Assembly of India (Legislative) Debates. (Part I- Questions and Answers). Pg 1713-1717.

³⁴ Constituent Assembly of India (Legislative) Debates. (Part I- Questions and Answers). 4th April, 1949. Pg. 2061.

³⁵ 'Recalling of Indians serving abroad possessing high scientific and technical qualifications.' In Starred Questions and Answers. Saturday, 19th March, 1949. Vol. III. No.2. , Part I. Constituent Assembly of India (Legislative) Debates. Part I- Questions and Answers, 1949. Pg 1665.

required to give an undertaking, that on completion of the course abroad they will enter employment.'³⁶ The statement summarizing the views expressed by various sponsoring ministries endorsed that, the Ministry of Education should acquire the 'role of a centralizing and coordinating agency not only for the matter of selection but also for corresponding with other ministries.'³⁷

A case for the speedy establishment of a home-grown system of training also relied on the fact that it was becoming difficult to secure the services of experts³⁸, from Europe 'on account of their post-war rehabilitation of industries'. Interestingly, the Indian government could secure the release of German experts from the Allied zone of Germany required by Indian Industries.³⁹ For instance, in the case of the Eastern Technical Institute the Union Public Service Commission was unable to secure suitable heads for its departments. The problem was solved by the Government appointing a Selection committee which chose Dr. E. Weingartner, a German Technologist, as the Head of the Department of Chemical Engineering at the

³⁶ Mechanical, Electrical, Civil, *Chemical,*Marine, *Aeronautical engineering, *Metallurgy, *Architecture, Regional Planning, Building Construction, *Geology are some of the courses announced in the Government Scheme for Training of Students abroad. The subjects starred at present concern the central Government only.' In Science & Culture. Vol. X, No. 8. February, 1945. Pg 331.

³⁷ F. 29-6 / 49 - S.I. Ministry of Education, 1949. Government of India.

³⁸ 'Dr. Trone an American Engineer was visiting India for a brief period and was engaged on the terms that the Chinese Government were paying at that time i.e. \$ 2000. He was in Russia for a number of years as an Electrical Engineer and later also throughout the Five Year Plan in which he was one of the important persons engaged by the Soviet Government. Altogether he spent eight or nine years in Russia, working there. Subsequently, he had been to Germany and Italy in connection with large industrial schemes. He was then engaged by the Chinese Government and he spent several years there, in China. He has been to Japan, Manchuria, Formosa. He had assumed charge on 12th August, 1949 and had submitted four confidential reports. 'Industrial Progress Report.' Starred Questions and Answers. 19th, December, 1949. Vol. IV, Part. I. Constituent Assembly of India (Legislative) Debates. Pg. 534-436.

³⁹ Questions were asked about the recruitment of politically objectionable Germans scientists for jobs in India and the government stated that it received a request for about 200 experts from its departments and were thus, negotiating in order to get as many as it can. In 'European Technicians etc for services in India.' Starred Questions and Answers. Friday, 5th March, 1948. Vol. III. -No.1 . Constituent Assembly of India (Legislative) Debates. Pg. 1646-1648.'

Eastern Higher Technical Institution.⁴⁰ This measure was often interpreted as Dumping of Foreign Experts.⁴¹

The Instance of the Indian Scientific Mission (1944-45) comprising Sir S.S.Bhatnagar, Sir J.C.Ghosh, Prof. J.N. Mukherjee , Prof. S.K.Mitra and Prof. M.N.Saha was a prime instance, where prominent scientists directly engaged in contributing to the operation of the process of development that was to be undertaken subsequently. Their principal objective was to 'visit United Kingdom, United States of America and Canada to see how scientific and technical research was applied to the development of natural resources and for economic betterment of the people.' The committee came up with suitable recommendations on their return. In U.K. the mission examined research institutions of 'universities, research establishments maintained by industries, official and non-official research organizations, war production centers, agricultural research stations and also several special research stations brought into being to aid the war effort' and recommended that the primary requisite for any scheme of development was the creation of a cadre of technical personnel which can be accomplished by opening scientific offices in London and Washington and arrange for their training.⁴² For example, provisions were made for placing Indian students in Universities and Technical Institutions abroad, by establishing an Educational Liaison Officer in the United States of America.⁴³

⁴⁰ Ministry of Education. Report of Activities During 1949-1950 And Programme for 1950-51. Pamphlet No. 71. 1950. Pg. No. 44.

⁴¹ 'Dumping of Foreign Experts.' (Starred Questions and Answers). 27th March, 1946. Vol. VI. Constituent Assembly of India (Legislative) Debates.

⁴² 'Indian Scientists on their visit to the U.K. and the U.S.A.' Science & Culture. Vol. X. No.9. March, 1945. Pg 376-378.

⁴³ F.114-4 /45-E I. Department of Education, Health and Lands. Mr. M.S. Sundaram, Assistant Educational Adviser to the Government of India was appointed to the post of the Educational Liaison Officer in March, 1945.

Another important recommendation of the Indian Scientific Mission was to stimulate industrial and private research effort in India. They cited the example of the developed countries that invested in research and development, without which no industry could progress and observed that 'it is not surprising, therefore, that all the industrial establishments which we visited organized magnificently equipped research laboratories of their own, and their expenditure on research ran into millions of dollars.'⁴⁴

The Overseas Scholarship Scheme was subject to various criticisms: whether the 'lavish scholarships afforded for the so-called studies abroad by the Government of India, was one of the methods of reducing sterling balances in the United Kingdom?'⁴⁵ and as to why the same amount was not being invested in the development of higher education in India? Questions were raised about the future of Indian students abroad?⁴⁶ The Overseas Scholarship Scheme in spite of the heavy expenditure was considered necessary and essential partly because the personnel thus trained would be available for national development and for imparting training at the proposed institutes to be established. This was crucial as 'India cannot expect to have the most advanced facilities for specialized training in all the branches of learning.'⁴⁷ The scheme was mainly considered as a means of 'bridging the gap'⁴⁸ before home-grown facilities were developed. Alternatives were suggested to the overseas scholarship scheme which included evocations of the path adopted by the

⁴⁴ op. cit.

⁴⁵'Indian students for Advanced study in America and Europe.' In Starred Questions and Answers. Saturday, 20th February, 1946. Vol. II. Part I. Constituent Assembly of India (Legislative) Debates. Part I- Questions and Answers, 1946. Pg. 1203-1204.

⁴⁶ References to about two thousand students who have stayed back abroad citing it as a mere waste of money. In *ibid*.

⁴⁷'Indian students for Advanced study in America and Europe.' op. cit.

⁴⁸Letter by Ashfaque Husain, Deputy Educational Adviser, dt. 6th February, 1947. to Mrs. Watumull. In F.32-47/46 -OD I -/S9.

late Sir Ashutosh Mukherjee, the late Rash Behari Ghosh, the late Tarak Nath Palit and the late Jamshedji Tata, who had established the 'Indian Institute of Science and various professorships in connection with Calcutta University,' and 'not squandering the blood-money of poor Indian tax-payers by sending thousands of Indians to foreign countries.' The eventual establishment of an IIT, and enlarging and improving the facilities in existing technical institutions'⁴⁹ was the response to wasteful government expenditure.

Several measures were suggested in light of the alleged waste by the critics of the scheme. 'Ninety percent of the money earmarked for sending students abroad should be spent in India for Establishment of Permanent Chairs for such subjects which should be taught in Indian Universities and technical institutions, and to afford large number of properly qualified students the opportunity of studying in India those subjects for which they think they must go to foreign lands. Secondly Indian Universities should be aided to expand their laboratories for research facilities. Thirdly, the standard of secondary education In India should be raised by having facilities for scientific and technical education. Fourthly, the rest of the ten percent should be spent for training young Indian university instructors in foreign countries to equip them with the highest type of scientific education which they will impart upon their return to their students in Indian Universities.'⁵⁰

The Second World War which involved India against the wishes of the Congress Government had a great impact on the development of technical education in the country. The main aim now was to maintain the rapid pace of industrialization initiated during the war. One can notice that the efforts to develop technical

⁴⁹ *ibid.*

⁵⁰In Dr. Das Taraknath & G.J. Watumull. 'Stop this Waste.' Bombay Chronicle Weekly, September 22, 1946. In F.32-47/46 -OD I -/S9. Department of Education.

education was not limited to the higher technical institutions alone. The Abbot-Wood report which formed the basis for the report of the Technical education committee of CABE, 1943 primarily dealing with the progress of the TE at the school level, the Post war educational report under the aegis of John Sargent which led to the establishment of the Sarker committee recommending institutes for Higher Technical Education, formation of APTI and then AICTE for the coordination of technical education in India are examples of an all round effort to consolidate and introduce means for the provisions of technical personnel at all levels for the process of industrialization. By the time the benefits of these measures could materialize provisions were made for the sending of students abroad to train for the facilities not available in this country.

CHAPTER V

CONCLUSION

The founding of the Indian Institutes of Technology can be considered as an important event in the history of technical education in India. A chain of these institutes was established in the 1950's and 60's for the purpose of creating engineer-technologists required for the industrial progress of the country. Though the first IIT at Kharagpur was set up in 1951, one can see through this study that the conception of these institutes was not just a representation of the process of development undertaken after independence but was embedded within the critique of colonial rule concomitant with the rise of nationalism in the country. In the process an independent structure novel to then existing Indian system of education was adapted to initiate and foster industrialization.

The aim of this study has been to primarily trace the emergence of the idea of the Indian Institutes of Technology presuming the existence of an implicit relationship between the growth of technical education and industrialization. At the same time, an attempt has also been made to outline the context within which this relationship resulted in the formation of the IIT.

The growth of technical education in this study has been narrated within a framework that explores two diverse interests of the colonialists and the nationalists, thus, also highlighting the different perceptions both parties had, regarding the course of the industrial development of the country. This affected the type of institutions established and envisioned by both, necessary for the generation of technical manpower required. The provisions made by the British for engineering

education in the three presidencies were guided by the needs of the public works departments previously established. Technical education otherwise constituted the industrial and technical schools for artisans which were not considered adequate by the nationalists if India had to follow the path of the industrialized countries.

The emergence for the demand of Higher Technological Education can be traced to the rise of economic nationalism of the country. The early phase of the freedom struggle, when the moderates held sway, included a program of exposing the extent of colonial exploitation occurring in the country, thus illustrating that the British rule had imposed a colonial economic structure which deprived the people of industrial development. According to Bipan Chandra the Indian economy 'had felt the full impact of industrial capitalism without industrializing in the process.'¹ The economic structure inherited as a result of colonialism shaped the vision of industrialization the nationalists shared, and this legacy left its trace in the post colonial institutions of higher learning.

One facet of national freedom struggle was the establishment of structures independent from the universities then present, as they were conceived to be instruments of the colonial government, and outdated for the proclaimed agenda of industrial development. The first institute belonging to this category was conceived in 1896 by J. Tata, subsequently founded as the Indian Institute of Science in 1909. The IISc is said to have played a pioneering role in the development of the Indian Institutes of Technology in its formative years as the first teachers for the Higher Technological Institutes were drawn from this institution. The Swadeshi movement was also an occasion for the program of nationalization of education, which saw

¹ Chandra Bipan. (1979). 'Nationalism and Colonialism in Modern India.' Pg 3.

birth to the Bengal National College and the Society for the Promotion of Technical Education. The Massachusetts Institutes of Technology had by this time captured the imagination of the nationalists and the establishment of such an institute was considered as a prime necessity for the progress of the nation.

Technological education was not the only concern that received attention of the nationalists. New kinds of universities were for the first time being set up, different from its predecessors in its composition and functions. These were the teaching and residential universities unlike the older examining and affiliating ones. Elaborate provisions for setting up of departments teaching in science and technology and engineering were made, and one such university was the Benares Hindu University inaugurated in 1915. This was increasingly becoming a feature of the new universities established, after the reorganization of the first generation universities in the 1920's. Though, the First World War catalyzed the realization of the importance of scientific and technological education in India, official effort in this regard was minimal.

Provincial Autonomy in the 1930's provided an opportunity for concrete efforts by the nationalists to undertake programs for the development of technological education. Here we can see a return of the model of MIT into the discourse of planning for post war industrial development. The period of the Second World War saw the formation of the Association of the Principals of Technical Education, and the All India Council for Technical Education designed to formulate a national policy for the coordination of technical education. The AICTE was attributed an advisory status for the development of Higher Technical Education, but pending its formation the Sarker Committee, headed by N.R. Sarker, was constituted and it

submitted the report in 1946 recommending the setting up of Higher Technical Institutes in four regions of the country. But the institutes were unable to start functioning even after three years of independence due to the immediate political disturbances and financial stringency that marked the following years. In the mean time the Overseas Scholarship Scheme suggested by Sir Ardeshir Dalal was revamped to meet the immediate requirement of technical personnel necessary for industrial development. Keeping with the objective of self-sufficiency that was to be achieved, after independence the first IIT was set up at Kharagpur in 1951.

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