Indian Journal of History of Science, **27**(2), 1992

SCIENCE VERSUS TECHNOLOGY: THE EARLY YEARS OF THE KALĀ BHAVAN, BARODA, 1890-1896

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(Received 11 November 1991)

The Faculty of Technology & Engineering *(Kalā Bhavan)* of the Maharaja Sayajirao University of Baroda completed one hundred years of its functioning in 1990 and today it is one of the leading educational institutions in India in the field of applied science. But it was by no means easy to start and develop it. This paper shows how purposeful and concerted collaboration between a scientist and the ruler of the then princely state of Baroda made this possible and how the institution building process created an environment conducive to economic and social transformation. Based on family papers and archival sources, this essay points out that the *Kalā Bhavan* epitomised the transition from the traditional forms of production into the factory system during the most critical phase of India's colonial history.

A few Indian scholars have recently pointed out that India evolved a great scientific tradition and that it was more 'humane' and 'individualistic' than the 'aggressive' and 'manipulative' science which developed in the West in modern times. The Indian tradition was well-rooted in its philosophical and cultural systems. It lost its vigour as a result of the adverse scientific and economic policies of the British imperialists[1]. Developing this theme, Ashis Nandy has argued that India's creative scientific tradition, as reflected in the life and works of Jagadis Chandra Bose (1858-1937) and Srinivasa Ramanujan (1887-1920), had potentialities of providing alternatives to the well-entrenched, capital-intensive scientific estate — the 'Big Science', as he calls it — of the West. Ultimately, both of them failed. Nandy has explained Ramanujan's failure in terms of his ignorance of Western mathematics. Bose was more formidable and articulate. He also possessed the capacity to conceal his deep-seated mental aversions and even hatred for the Western scientific intrusions while labouringly making efforts to maintain cordial professional and social relations with the British bureaucrats and scientists. 'Poverty and colonial status', Nandy observes, 'become corroding when they enter a person's or a group's self-definition and psychological forces. In the case of Bose and Ramanujan, this internalization took place and they had to fight their demons outside as well as within'[2].

Whether Nandy intended or not, his reference point is the scientific tradition managed and controlled by the elite castes and social groups. But in terms of historical analysis it would be deceptive to think in terms of *the* Indian scientific tradition, for, India generated two distinct scientific strands, one being overwhelmingly theoretical and speculative and the other technological or empirical. The first one was developed and monopolized by the Brahmans. They developed arithmetic, astrology, astronomy, medicine, and other physical and natural sciences. Their ideas were couched in the language of the elite, namely, Sanskrit. In contrast, the technological tradition remained too confined to its operative part to need theoretical explanation. It remained

subservient and suppressed, because it was rooted in the activities of the *śudras*, members of the illiterate artisan castes, who lived in a servile state from generation to generation. The elite scientists would not touch certain raw materials for productive use. The *śudras* would seldom have access to the 'divine' language.

It thus follows that India generated two scientific traditions, the elitist and the *śudric*, and that there was little or no meaningful dialogue between those who produced ideas and those who produced goods and services. That the Brahmanic tradition lacked adequate experimental support could be shown by the following remarks of Dr John Fryer, a British medical practitioner, who visited Surat in the 1670's: 'They (Brāhmans) are not quite ignorant of medicks, though anatomy is not approved wherein they lean too much on tradition being able to give a very slender account of the rational part thereof... every one ventures and every one suffers; and those that are most skilled, have it by tradition or former experience descending in their families, not considering either alternation of tempers of seasons, but what succeeded well to one, they apply to all... they pretend to understand the pulse, but urine they will not look on'[3].

The traditional scientific system persisted in India when the country passed into the British hands. A noticeable change under the British rule was reflected in the admission of the *śudras* and the untouchables in the educational institutions. This helped pierce some pores in the older social fabric, enabling the weaker sections to enter the schools. But there were other features of the British rule which proved destructive. The British economic policies, for instance, resulted in the annihilation of the Indian artisans without generating new industries to replace them. Also, the colonial rulers devised and pursued the policy of racial discrimination and scientific apartheid, preventing educated Indians from holding responsible jobs[4]. As early as 1835, C.E. Trevelyan, a British official, had passed an invective: 'We have nothing to give to the natives but our superior knowledge. Everything else we have taken from them. We have, however, our knowledge to give them in return'[4].

It was during this hostile psycho-culural and economic environment that a few scientists emerged in India in the later half of the nineteenth century. Unlike the Tamilian mathematician, Ramanujan, they were well acquainted with Western science. Though none seems to have possessed the creative genius of Jagadis Chandra Bose, they were, nevertheless, less self-righteous and less arrogant. Accepting the advanced scientific knowledge of the West, they made efforts to transform their theoretical insights into workable industrial enterprises. Some of them launched unconventional industrial enterprises. For instance, Professor P.C. Ray (1881-1944) set up a modern pharmaceutical and chemical unit, the Bengal Chemical Works in 1900[5]. Professor Laxmanrao Kirloskar (1869-1956) pioneered modern engineering industry[6]. Professor T.K. Gajjar (1863-1920) belonged to this genre of Indian scientist-entrepreneurs. He founded the Alembic Chemical Works at Baroda, in 1907. He set up a polytechnic institute *(Kalā Bhavan)* at Baroda. He also raised India's image in the world of science by removing indelible stains from Queen Victoria's statue, Western scientists having failed in this respect. This article shows how Gajjar set up the polytechnic school at Baroda, the capital of a princely state in Western India. It also points out how

this school threw up opportunities to the rural masses, particularly to the members of the artisan castes who had been earlier denied access to the educational institutions. As there are few empirical studies linking professional-technological education with the society, the present study is relevant.

(II)

There were few polytechnic schools in India at a time when Professor T.K. Gajjar made efforts to establish such a school in the 1880's. The existing educational system tended to make a student unfit for any industry or manual work. After he left the school, his desire was to get a petty government job. Things had come to such a pass that even the sons of the agriculturists, carpenters, blacksmiths, and other artisans preferred government jobs to their family trade. In the middle and higher classes of Indian society it was generally not considered respectable for a man to follow an industry where he had to work with his own hands.

This was a sad phenomenon for which the colonial educational system was alone not responsible. The root cause of this malaise lay in the process of deindustrialization which had set in motion since the beginning of the nineteenth century. The subsequent period was marked by over-crowded land and broken artisan industry. As against that, the government jobs, however scarce, assured fixed income and a chance to rise by promotion. And the training that the student received exactly fitted him for lower government jobs.

In short, too much attention was paid to subjects that had nothing to do with the agricultural or the industrial problems of the country. The studies provided a general and literary education without any special purpose. Although the government made some efforts in the direction of creating facilities for technical education, they were half-hearted. The technical schools established through the private charities of Indians had usually to be closed for lack of recurring expenses. Table I depicts this state of affairs.

Table I. List of Industrial Institutions, Schools or Classes, 1823-1901

Sl. No.	Name	Place where started	Year of establi-shment	Agency by which started	If closed when	Remarks
1	Engineering Institution	Bombay	1823	Government	1830	Removed to Poona in 1830
2	Government Engineering Institution	Poona	1830	- Do -	1832	—
3	New Engineer-ing Class	Bombay	1854	- Do -	1857	—
4	Engineering School	Poona	1854	- Do -	—	Still continues

Sl. No.	Name	Place where started	Year of establi-shment	Agency by which started	If closed when	Remarks
5	Industrial School	Dharwar	1873	- Do -	1880	—
6	Reay Art Workshop	Bombay	1889	- Do -	—	Continues as a branch of the J.J. School of Art
7	Training College Workshop	Dharwar	1889	- Do -	1915	—
8	Engineering Class	Bombay	1844	Board of Education (Semi-Government)	1847	—
9	C.P. Parekh Industrial Institute	Surat	1863	Private	1868	Re-opened in 1878 as a municipal managed "F.S. Parekh Technical Institute"
10	School of Industry	Ratnagiri	1863	Private		Under the management of the Local Body since 1879
11	Industrial School	Dhulia	1880	Local Body	1883	—
12	School of Industry	Pandharpur	1881	- Do -	—	—
13	V.J. Technical School	Poona	1892	Municipality	—	—
14	Industrial School	Sewri, Bombay	1843	Set up by Dr. Busit, a philanthropic clergyman	—	Continued as "David Sassoon Industrial School", Matunga
15	Apprentices Home	Bombay	1879	Bombay Education Society	1912	—
16	Victoria Jubilee Technical Institute	Bombay	1887	Committee of Management (Semi-government)	—	Continues

Sl. No.	Name	Place where started	Year of establi-shment	Agency by which started	If closed when	Remarks
17	J.N. Petit Orphanage	Bombay	1898	Trust	—	—
18	Poona Native Institution Workshop	Poona	1887	Association	1889	—
19	M.V.E. Society's Industrial Class	Barmati	1898	Maharashtra Village Education Society	1923	—
20	Lavji Mistry's Industrial Class	Ahmedabad	1890	Private	1895	—
21	Drawing Class	Nasik	1894	- Do -	1895	—
22	Industrial School	Vankavli (Ratnagiri District)	1899	- Do -	1922	—
23	Orphanage Press Industrial School	Poona	1881	Free Church of Scotland	1902	—
24	Industrial School	Sirur (Poona District)	1882	American Mission	1948	—
25	Industrial School	- Do -	1882	American Mission	1948	—
26	Industrial School	Ahmednagar	1889	S.P.G. Mission	1940	—
27	D.M. Petit Industrial School	- Do -	1892	American Mission	1934	—
28	Industrial School	Alibag (Colaba District)	1888	Free Church Mission	1889	—
29	Industrial School	Koregaon	1893	S.P.G. Mission	1897	—
30	Industrial School	Malegaon	1894	Church Mission Society	1895	—

It is seen from Table 1 that out of 30 schools set up during the period 1823-1901, 21 schools were closed. Thus, the casualty rate was as much as 70%. It was as follows[8]: Government schools, 5 out of 7; schools run by Associations, 3 out of 3; and Schools managed by Missions, 8 out of 8. This shows that the government's attitude towards the polytechnic schools was anything but favourable. Though the Bombay Government had founded polytechnic institutes at Poona (1830), Bombay (1844), Dharwar (1873) and Dhulia (1880), they soon ceased to function for want of encouragement and grants. A few institutes set up through private endowments of the Indians met with a similar fate. The Cursetjee Furdornjee Parekh Technical Institute, Surat (1863) and the Lavji Mistry's Industrial Class, Ahmedabad (1890) are the cases in point. The Engineering School, Poona (1854), and the Victoria Jubilee Technical Institute, Bombay (1888) were perhaps the only institutes worth their names in the whole of Bombay Presidency, and the V.J.T.I. had been founded not by the government but through the endowments of business magnates like Sir Dinshaw Petit and Harkisondas Narotumdas, and partly through funds of charitable institutions and local bodies[9].

The government often defended its stand by arguing that the technical schools were not relevant to an industrially backward country like India and that industry should precede technical knowledge. Sir A.B. MacDonnell wrote in this vein when he pointed out in his *Report on the Technical Education in India* (1885) that so long as India remained backward, the government's efforts in the direction of technical education were doomed to failure[10]. Later on, however,the government changed this stance. The *Report of the Industrial Commission of India (1918)* admitted that the government which had been wedded to the *laissez-faire* doctrine had hardly made genuine efforts to promote technical education in India and that the opportunities for gaining experience were not easy for Indians to come by, and there was no attempt at technical training for industries until nearly the end of the nineteenth century, and then only at an inadequate scale[11].

The Indian intelligentsia was not a silent spectator to this state of affairs. Persons like Justice K.T. Telang, Pherozeshah Mehta and Budroodin Tyabjee, who were the members of the governing body of the prestigious V.J.T.I., raised their voice in favour of technical education. A large number of Indian newspapers launched crusade against the government's apathy towards technical education. The *Gujarat Mitra* (Surat), for instance, criticized the government for 'taxing, draining and drying of the country, while on its weakest side — that of technical education — it is left to flounder or hibernate in the groove of centuries'[12]. The Pune-based *Mahratta* was more specific and vocal. It wrote: 'Indians are not getting jobs because they are given only liberal education. They find that their knowledge is of no help to them in the world where practical training is all that is required, and the Government is the only competent body to take up the problem of technical education in the country. A wave is now passing all over the country, agitating the minds of the people and drawing their attention to the subject of technical education. There is a stir on all sides — a stir which promises to result in some practical steps being taken to remedy this evil![13].

The stir was, however, not only against the colonial government but also against the members of the artisan and the 'untouchable' castes who were then entering

educational institutions. The *Native Newspaper Reports of the Bombay Presidency* during the years 1862-90 show beyond doubt how the higher caste intelligentsia used newspaper media against the entry of the depressed castes people to the educational institutions.

The above analysis shows the grim social reality which Indians were facing. The government's hostility towards technical education had become an important issue among the educated high caste Hindus and it was articulately debated at the organisational level and in the newspapers which they controlled. There was a consensus among them that technical education held an important key to the solution of their economic problems, and that it was the duty of the government to promote technical education.

Gajjar's efforts for promoting technical education should be viewed and appreciated in the context of this complex environment. High caste Hindus were fighting the colonial regime to enlarge and share the economic cake, resisting at the same time government's and social reformers' attempts to soften the cake of social custom. Gajjar's family and caste background enabled him not only to perceive these problems but also to take concerted action in the direction of technical education.

(III)

Tribhuvandas Kalyandas Gajjar (1863-1920) belonged to the *suthar* (carpenter) caste of Surat. The *Suthārs* were 'low caste' people in the traditional hierarchical parlance of Gujarat, but the *vaiṣya suthār* caste to which Gajjar belonged enjoyed considerable social status among artisans because of its observing high caste norms. The members of this caste also operated as timber merchants and accumulated considerable wealth in the urban centres of Gujarat[14].

Gajjar's family had a sound technical base. His grandfather and granduncle were successful civil engineers and had designed and constructed a number of houses in the Gopipura area of Surat[15]. They had made innovations in the existing architectural style and also compiled and published a work on *Śilpa Śāstra* or science of architecture. It was in recognition of their innovative talents that rich persons of Surat consulted them in designing their bungalows. Sayajirao Gaekwad (1862-1939), the ruler of Baroda, had also invited Gajjar's grandfather to design a palace for him on the pattern of Hindu architecture. It took the architect little time in sketching out some 16 plans with the help of one Shivlal Ugarchand, a modeller and sculptor of Patan, the renowned capital of ancient Gujarat. The Maharaja selected one of the plans and directed the architects to complete the work[15].

Kalyandas, Gajjar's father, owned a large timber shop at Surat. In 1881, he set up another timber shop at Ahmedabad and directed his two sons, Jaikishandas (1853-1925) and Gordhandas (1855-1920), to manage the Ahmedabad shop. The sons had been educated at the Engineering College, Pune. This experience stood them in good stead in developing the family enterprise[15]. They made headway through

government contracts. They also sold timber to individuals for building purpose. The accounts book of Mahipatram Rupram, a noted social reformer of Gujarat, shows that the reformer purchased timber and wooden frames from Messrs Kalayandas Bhanabhai in the year 1888[16]. The Gajjar family combined carpentry and trading for enhancing their economic interest.

(IV)

T.K. Gajjar was the product of this environment. But this was not all. Apart from inheriting his rich family and caste tradition, Gajjar breathed the environment of his city. He was born at a time when Surat was undergoing social and economic transformation. The British had evolved a viable legal and administrative system based on secular principles, and had also broadened the social base by opening schools for boys and girls, printing text-books, opening public libraries, and encouraging women and artisans to attend schools. A number of social reformers, led by Durgaram Mehtaji (1809-76), launched crusade against social evils[17]. The Surat entrepreneurs were, at the same time, trying to revive the old glory of their city. This was reflected in the setting up of the Jaffer Ali Spinning and Weaving Mill (1863), the Goolam Baba Spinning and Weaving Mill (1876) and a paper mill (1877), all being Muslim enterprises[18]. A British official captured the city's ethos when he spoke on the occasion of the opening ceremony of the Goolam Baba Spinning and Weaving Mill (1876): "The people of Surat see in the mills the realization of the efforts of some of their leading men to restore to their fallen but much loved city a portion of their glory. It is a matter to be desired that the capitalists of this country should be aware of the advantage to be gained by a combination of their wealth with the skill, the knowledge, and the experience of the West"[19].

This was the social milieu in which Gajjar spent his formative years.

(V)

Tribhuvandas had a brilliant academic career ever since he joined the primary school in 1869. He enjoyed reputation for his ability to instantly work out arithmetical problems. He pursued arithmetic along with geometry and algebra at the high school level. He was often asked by his teachers to explain mathematical problems to the class. Whenever he found that his teachers gave stereotyped steps in Euclidean geometry, he suggested modification in the figures and deduced some problems therefrom. The boy's other favourite subjects were physics and chemistry. On one occasion (1878), H.M. Birdwood, a visiting Educational Superintendent, took oral test of students in science and mathematics. He found Gajjar so bright that he presented him a book on geology with the remark that the boy would make a name[20].

As a teenager, Gajjar was fond of doing scientific experiments. He did experiments in light, sound and electricity. The boy would often carry broken apparatuses to his father's workshop and put them in working order. He had cultivated painting and drawing as a hobby. Later on, under the careful supervision of his father, this took the shape of mechanical drawing. 'I learnt mechanical drawing', Gajjar later

wrote, 'in my high school days, and at that time, I acquired skills of carpentry using tools and implements at my father's workshop'.[21] For Gajjar, thus geometry and arithmetic were more than mere theoretical exercises.

After passing his matric examination in the first division in 1879, Gajjar decided to join the Elphinston college at Bombay. This was an important decision, for the college was older than the Bombay University and its mathematics and chemistry departments had earned fame. But this was not all. Bombay, though geographically near Surat, was different in many ways. It had developed as an industrial and cultural capital of India. It contained a large heterogeneous population, including members of professional groups — doctors, advocates, engineers, traders, industrialists and intellectuals[22]. It was not uncommon for the Bombay elite to come in contact with British merchants and government officials. Its mill agents and marketeers consisting most predominantly of Gujarati-speaking persons maintained cordial relations with Europeans and often collaborated with them in floating mercantile enterprises. Earlier, they had assumed a compradore role, playing a second fiddle to large European mercantile firms[23]. But since the 1850's they began to utilize their experience and savings for floating textile companies, with the result that by 1880 Bombay emerged as a major textile manufacturing centre in India[24].

During his student career in the Elphinston College, Gajjar distinguished himself as he had done at Surat. Here, he came in contact with students who were to play significant roles in their respective professions — persons like Chimanlal Setalwad, M.V. Gokhale, M.G. Deshmukh, the Athalye Brothers, and Lallubhai Samaldas[21].

Gajjar passed his Previous Examination in first class.The Previous Course combined the arts and the science subjects. Gajjar wanted to continue these courses, and with this end in view he applied to the authorities of the Bombay University to arrange classes in such a way that he could attend both the first B.A. and the first B.Sc. classes simultaneously. The University, however, turned down his application. After passing his first B.Sc. examination in 1881, he offered chemistry, botany and physiology for his second B.Sc. As there was no provision for physiology at the Elphinston College, Gajjar was allowed to attend classes at the Grant Medical College. Here, he cultivated friendship with Dr. M.G. Deshmukh who was then working for his post-graduate (M.D.) degree in medicine. Deshmukh was a brilliant student and he was several years elder to Gajjar. He also possessed the first medical degree, namely,L.M. and S. This friendship stood Gajjar in good stead. Dr. Deshmukh guided Gujjar in his academic studies and exerted his influence, which allowed him to use the chemical analysis laboratory. Gajjar later wrote that his friendship with Dr. Deshmukh served as a training ground. He also mentions that the laboratory of the Grant Medical College provided him an opportunity to pursue his 'self-study' which comprised anatomy, botany, physiology, zoology and therapeutics[21].

Gajjar was a favourite student of his chemistry professor, Dr. J.B. Lyon. In recognition of his talents, Dr. Lyon made him his laboratory-cum-lecture assistant at the Grant Medical College.This gave him yet another opportunity. It is no wonder,

therefore, that with this experience and native intelligence and skills, Gajjar passed his final B.Sc. examination (1882) in the first division with chemistry as a special subject and botany and physiology as subsidiary subjects. He stood first in the chemistry group, securing 75% marks[25].

Gajjar's performance got him a teaching fellowship at the Elpinston College. He taught physics and chemistry to junior students. At the same time he worked for his B.A. degree and earned it in 1883 with higher mathematics as a special subject. Thereafter, he attended the government law college. This decision was influenced by his friend, Chimanlal Setalwad (1864-1947), the future legal luminary of India. Chimanlal belonged to the *Brahmakṣtrīya* caste about which the Gazetteer states: 'Though small in number (2509 in 1891) they are a prosperous intelligent class and anxious to give their boys a good schooling. Their intelligence and wealth give *Brahmakṣtrīyas* a high position among Gujarat Hindus'[25]. Chimanlal's forefathers pursued legal profession. His grandfather, Ambashankar Brijrai (1782-1853), was the Principal Sadar Amin at the time of his death in 1853. Chimanlal's father, Harilal (1831-1899), was the first class subordinate judge when he retired in 1877 and thereafter he functioned as the Diwan of Limbdi State in Kathiawad. Chimanlal himself continued this tradition when he joined the Government Law College[26]. He succeeded in persuading his friend to attend law classes. Chimanlal and Gajjar shared a room in Bombay. They started reading law together. But Gajjar never got interested in that course. The following excerpts from his unpublished diary shed light on the working of his mind at that stage.

i. I shall have to study for LL.B. one year more for the degree examination, and for several years more for practice.

ii. I shall have to adapt myself to an entirely new course of intellectual work. Law is a very dry and tedious subject for me. I look upon it as a trash, though I know that it is very important in the economy of the world.

iii. This course will leave no time and energy for useful work. By itself lawyer's business is quite unproductive.

iv. I do not have great hopes of shining in the law in Bombay and I do not like to be mediocre in any line[21].

The above observations reveal the mind of the young scientist and his attitude towards law. But he was still indecisive; expressing the typical attitudes of the 19th century university student, he wrote:

'Considerations in favour of law'.

i. This line is most agreeable to my father and brothers who wish to see me as a big officer.

ii. In practice, I shall have Bombay life in company with Chimanlal and this would give me a sweet home.

iii. Besides, my public life would be passed in the midst of intelligent community.

iv. Bombay will afford a better field for my taste when I shall have retired from my business.

v. In judicial service I shall have a quiet and settled life.

vi. I might perhaps rise very high either in the judicial or in the revenue line[21].

Gajjar 'studied' law with ambivalence, almost against his will. As the examination drew near, he felt nervous and started taking medicines. The regret was obvious. He failed in all the subjects, except in jurisprudence[21].

Gajjar now flirted with the idea to be a member of the Indian Civil Service. In the meantime, his child-wife who had been living with him suddenly died. This shocked him. He had, however, a Brahman friend, Manilal Nabhubhai Dwivedi (1858-98), the future theologian and Sanskrit scholar and a champion of antireformism. Dwivedi persuaded him to join the M.A. classes and study Sanskrit and philosophy. 'This will give you solace and peace of mind', he pleaded[21]. Dwivedi was studying these subjects for his M.A. degree, visiting brothels at the same time for recreation. Dumping his chemistry books on the shelf, Gajjar now applied himself to Sanskrit, history and philosophy. His interest, however, proved shortlived. On Dr. Deshmukh's advice, he gave them up in favour of physics and chemistry and eventually passed his M.A. degree in 1884.

Gajjar was twenty-one then. His student career being over, he had to decide about the future plans. He had a flourising family business where he could have managed a shop at Surat or Ahmedabad. But he had little interest in the traditional craft-based business. At the same time, he was not in a position to decide which career to pursue. It was at this time that he came in contact with Tapidas Varajdas (1826-85), a Surat-born millionaire who had settled in Bombay. Tapidas was a *Vaiṣnava* Bania having financial and industrial interests in Bombay. He had taken a prominent part in floating several textile mill companies. Tapidas had his roots in Surat, where he had been a trustee for the Hindu charitable fund. Gajjar asked the *śeth* to spare some funds for setting up a polytechnic institute at Surat. The millionaire took a fancy for Gajjar's idea and asked him to go ahead with his scheme. He promised him Rs. 2,00,000.00 for this purpose. This led Gajjar to study the problem and he came out with a booklet, *A Proposal for a Polytechnic Academy at Surat,* in April 1886. The objectives of the Academy were:

1. To train the artisans and the peasants in the scientific principles involved in agriculture and industrial arts and in practical work in the workshops and laboratory, so as to enable them to carry on their individual callings with profit.

2. The aim is not merely to teach the scientific principles necessary for the improvement of the existing industries, but to enable young men to take up new manufacturing industries that can be found remunerative.

3. To train qualified scientific teachers for the local primary schools.

4. The Surat Academy will serve as an example for the other urban centres in the country.

As pointed out earlier, at a time when Gajjar published his booklet, India had been severely handicapped by the lack of engineering and scientific institutions. His booklet, therefore, attracted country-wide attention. Most of the Indian newspapers congratulated him for his novel ideas and also carried on fresh debates on the problems of technical education in India. But in spite of the publicity which the booklet brought him, Gajjar's project remained still-born; the old millionaire who had assured his support died in May 1886[27].

(VI)

Frustrated in his attempts to realize his dreams, Gajjar spent an anxious time in Surat and Bombay. But not long before, he received two offers, both professorships. The professorship at the Sind College, Karachi, was to fetch him Rs. 300.00, and that at Baroda, Rs.200.00 per month. Gajjar noted in his diary that he assessed the situation in terms of his professional growth rather than monetary considerations. Gajjar was well aware of the progressive economic and social policies of the Baroda State. Considering his action as a 'big sacrifice', he accepted his appointment as a Professor of Chemistry at Baroda College in 1887[21].

In view of the fact that the young Gaekwad, Maharaja Sayajirao (1862-1939), was an enlightened ruler of Baroda State, Gajjar's career in Baroda for a decade (1886-96) was bound to be significant. Sayajirao had established a number of educational institutions, including Arts, Science, and Music Colleges, and he had taken steps for ameliorating the condition of women, untouchables and the tribals in his state. 'The education of the backward classes', a contemporary account states, 'has been specially attended to by holding out special inducements to them, and opening a boarding school for their benefit'[28]. The Maharaja decided to make primary education free and compulsory and selected nine villages of Amreli Taluka as an experimental measure[28].

Under the personal supervision of the Maharaja, the Government of Baroda adopted a series of comprehensive economic measures for the promotion of agriculture and industries[29]. To popularise these measures, particularly among the rural folk, the government held an exhibition in December 1881. The exhibits included industrial machinery, agricultural implements, a variety of seeds and plants, textile goods, cutlery and hardware, glassware, leather work, electroplating and metallurgy, and pottery. The government offered wastelands for cultivation at low rates, granted advances to agriculturists at low interest, and encouraged new methods of cultivation

by setting up model experimental farms. In 1882, Sayajirao set up a cotton textile mill comprising 10,328 spindles and 104 looms. In 1884, he set up a sugar factory. These were state enterprises. They were pioneered with the declared intention to hand over their management and control to a private party at a suitable moment. He had taken this initiative to encourage the merchants and *sharafs* to set up industrial ventures. This was followed by the establishment of a glass factory, dyeing and bleaching factories and distilleries. In 1882-83, the government abolished a number of taxes and levies on industries and agriculture. In 1882, he visited the Kadi Division of the State with a view to getting first hand information on the condition of his rural subjects. This became a regular feature of his policy. A contemporary account states:

'His endeavours to promote the well-being of his subjects, his efforts to improve their condition, and his attempts to enlarge their minds are now familiar as household words all over India'[30].

With such an enlightened ruler at the helm of Baroda affairs, Gajjar found it easy to exert his influence on the course of scientific education in the State. He urged the Maharaja to set up a Polytechnic School at Baroda with the sound reasoning that it would attract a large number of students from the artisan castes. The Maharaja hardly needed to be persuaded. Earlier in August 1886, while presenting prizes to the students he had expressed his desire to evolve a 'satisfactory scheme for the opening of a technical school'[31]. The Maharaja asked the professor to go ahead with the project. He relieved him of his routine official functions. Gajjar made extensive tours to various parts of the state to study the indigenous industry, particulary the dyeing and printing works. At the same time, he contacted a number of foreign manufacturing concerns to seek help for the proposed polytechnic institute. One such firm was Messrs Farhen Fohrican Bayer and Company, Ethrfeld. This was a world-famous German firm known for its dyes and chemicals business. This firm appointed him as its consulting chemist. Gajjar started building up a laboratory with its help. It seems that he acquired from this company the knowledge of producing Turkey-Red colour and other synthetic dyestuffs considered to be a 'trade-secret' in those days. Gajjar built up his personal laboratory with great care and at considerable expense. He trained several dyers, the low-caste students in his laboratory, in the new processes. At this time, J.N. Tata, a noted entrepreneur, came to know about Gajjar's innovative activities with regard to the production of synthetic dyes. He requested Gajjar to help him construct the dye-houses for his Empress Mills at Nagpur, and the Swadeshi Mills, Bombay. Gajjar charged professional fees and with the help of his students and skilled dyers he developed dye-houses for the Tata Mills[21]. Technological knowledge was thus meaningfully linked with the country's industrial activities.

The above activities were related to the *Kalā Bhavan* Project. They enabled Gajjar to link his ideas and practical experience to the requirements of the proposed scheme. Gajjar now came out with a monograph, *Note on the Development of a National System of Education for the Baroda State* in 1888. He made a strong case for a comprehensive technical educational system ranging from the primary school to what he called the 'technical university'. He wrote:

'There exists in Baroda at present an Arts College teaching up to the Previous Standard. In the beginning of the last year a B.Sc.class was opened in connection with the college, with a view to encourage scientific education. Looking to the B.Sc. curriculum, it will be seen that the aim of this science course is mainly to impart theoretical scientific education to the students. In other words it is disciplinary or non-technical. The B.Sc. class here has not attracted sufficient attendance. Besides, there will remain no necessity of continuing this class when the polytechnic university already referred to would be established, where ample provision would be made for all the useful branches of knowledge. My object is to press on the attention of His Highness the Maharaja Saheb the extreme necessity of overhauling and reorganizing the present system of education'[32].

Gajjar sent his monograph to Sir Remond West, Vice-Chancellor of Bombay University, for his comments. The Englishman wrote him back: 'I have not yet had the pleasure of reading anything on the subject, within the same compass, more sound, suggestive, and symmetrical. If you ever induce His Highness, the Gaekwar, to accept your principles and to get them worked out on an adequate scale by men of strong character as well as larger attainments, you may confer inestimable blessings on your countrymen, and make Baroda the intellectual capital of India'[21].

The Maharaja was in Europe at that time. The young scientist, in his moments of anxiety, sent a copy of his publication to him in Switzerland requesting him to visit the Polytechnic Institutes at Zurich. The Maharaja did not find time, but soon after his return he devised a scholarship scheme for sending bright professors and students to Europe for acquiring technical expertise. He set apart a large sum of Rs.1,00,000.00 for this purpose and asked top officials, including Gajjar, to prepare blueprints. Gajjar submitted his report on 15 April 1888 pleading that the State should utilize its funds for sending only those who possessed, among other things, a sound theoretical background. He suggested ways and means of utilizing the services of Europe-trained personnel in managing and developing the existing distilleries and other industrial units in the State.

The Baroda Government, under the above scheme, decided to send three persons to Europe. Adarji Masani, M.A., B.Sc., Professor of Physics at Baroda College was to learn geology and acquire diploma in that subject[33]. K.M. Joglekar was to study chemical industry. Joglekar had been a brilliant student of Elphinston College from where he had obtained first class Master's Degree in Natural Science in 1880 and had worked as a Teaching Fellow at the College thereafter. Like Gajjar, he had been a student of Dr. J.B.Lyon. The professor had certified that Joglekar had received several medals, including one for writing an essay on *Meteorology in India in Relation to Agriculture* in 1880. Joglekar had thereafter joined the services of the Baroda Government as the Head Master of the Sirdar High School. This was a prestigious school catering to the needs of the Maratha military nobility and other high dignitaries[33]. The third person chosen to go abroad was Gajjar.

Though the Baroda Government selected Gajjar for advanced studies in the U.K., he was not as much fortunate. The State authorities had asked him to study agricultural

chemistry and he had little interest in that branch. He also thought that learning agricultural technology in a foreign country was a useless exercise. In his letter dated 30 July 1888, he expressed these sentiments to Dewan Bhadur Laxmanrao Jagannath, Minister of Baroda, and requested him to convey his sentiments to the Maharaja. He wrote:

'It is wrong for the State to send me to Europe for agricultural chemistry. I have given my best consideration to the question where I might be able to effectuate His Highness' intention, in the branch selected for me, and nothing but my deep sense of responsibility impels me to state that the subject selected would be entrusted to some other hands... It is beyond my providence to consider whether agriculture is at all a subject in which the State can be able to achieve any substantial and lasting results for the people at large by importing exotic European modes of farming, particularly when the system of perpetual division prevalent among our people hardly leaves any scope for employment of large capital and costly machinery, and when eminent Indian authorities have declared that indigenous methods are about the best suited to the circumstances of the country. Not that there is nothing to be done in the direction, but I firmly believe European travel will not be of much assistance in that matter. I viewed the question, however, from my personal standpoint, and as I am not sanguine of exhibiting any substantial results, I think it unjust and undutiful for me to avail myself of His Highness' generous offer unless I know what is to be expected of me on return. Having already applied myself to some extent in the direction of manufacturing industries I entertain hopes of their succeeding in this country and supplying a real want, and it will be readily seen that a man could be expected to develop himself only to that which has attraction for him naturally and wherein he has reasonable hope of success. Having made up my mind on these grounds not to undertake the subject of agricultural chemistry, I hardly think it necessary to discuss the minor question of suitableness or otherwise of the terms of contract offered to me'[33].

Gajjar had no interest in agricultural chemistry, and he clearly exressed his views on this problem. At the same time he did not want to lose an opportunity of going abroad. Gajjar's diary provides fascinating information of his attitude and reaction towards the government's decision to select him for agricultural chemistry. The twenty-five year old youth pondered over the problem and in order to arrive at a rational solution, jotted down his ideas under the title "The Problem of My Life at This Stage". He wrote:

> Happiness is derived from leading a virtuous and peaceful life. Life is useful if it advances the good of the self, the family and others. My happiness lies in satisfying:

1. My material wants and also those of my family. These are moderate and can be provided without much difficulty. An average income of Rs. 300.00 per month would suffice for this purpose.

2. My moral wants are much developed owing to enlarged sympathy. "Live for others" is the maxim of my life. My home cannot be quite sweet owing to past

misfortunes and thus cannot make me content. Those who are happy at home are generally selfish and do not think of others. I am not one of them. The active play of sympathetic feelings can only keep me up.I am always restless and want some work of a noble nature. My chief pride lies in making others happy. Such a development of my moral nature has made me very ambitious of acquiring means to gratify my craving. The acquisition of wealth for its own sake has very little importance for me. Wealth I would have had by all means, but only because it is subservient to any aim of making others happy. If I get some government ready to place a portion of its capital at my disposal for public purposes I would not at all care for acquiring money[21].

After pondering on the above general aspects, Gajjar came down to the immediate problem: "Considerations in favour and against going to England". He assessed the situation in the following words:

Considerations in Favour

1. I might probably be able to win the good opinion of His Highness and get several useful works started with his capital.

2. I get double the present salary and might probably rise to Rs. 800.00.

3. I acquire a better status in the State as well as outside, and status is power.

4. The visit to Europe will give me some insight into the working of the industry. Thus I may be able to undertake some private enterprise.

Considerations Against

1. To go for agricultural chemistry is not useful, as any substantial results cannot be expected before long. Our people will demand immediate results and would be disappointed. Agricultural chemistry will place me in level with Mr. Moos and Mr. Jadhav (Senior Officers in the Department of Agriculture, Baroda State) who are doing nothing.

2. My constitution is not strong enough to resist influence of the cold climate. The risk is great and the prospects are not in proportion to it.

3. I may probably get the same sum, even more, by remaining here or following some independent pursuit.

4. The terms will not satisfy my old father who would consider me undutiful and would blame me for going for such a paltry sum.

5. My brothers would harass me much.

6. The separation from my younger sister is very painful. She is a child-widow and her whole life depends on me, and she can be happy in my company only. Without me she can never live. Her sad lot gives me the greatest pain and creates anxious fears in my mind. This consideration is most powerful.

7. I want to take a cook with me, whose expenses will not be paid by the State.

8. I shall have to undergo the difficulties and expense of being admitted into the caste[21].

Gajjar, in spite of his "considerations against" the visit, wanted to go to England and he made some efforts in that direction. But the State Government insisted on the agricultural subject, whereas for Gajjar it was a waste of time, if not money. Thus, the matter came to a close. Gajjar thought that Joglekar played a vicious role in this matter. In his words: 'K.M.Joglekar who has been promoted as an Assistant Director in the Education Department was at the backbone of the mischief'[21].

Although Gajjar could not visit England, his dream to found a polytechnic school was fulfilled when in March 1890 the Baroda Government took a decision to set up the *Kalā Bhavan* on the grant-in-aid principle. The Huzur order in this connection dated 25 March 1890 provides useful information on the objectives and policy and it needs to be quoted in full.

> The project of diffusing general and technical knowledge through the vernaculars has been under the consideration of government. The proposal of Mr. Gajjar to start such an institution on the grant-in-aid principle has been considered, and it is thought desirable on the whole that the experiment should be made as a State concern. It is accordingly directed that a Technical Institution should be opened at Baroda, where education of hand and the eye will be attempted side by side with that of the mind, and where instruction will be imparted mainly through the vernaculars. The object is to help the people to *improve the existing industries* and to introduce *new* ones that may be remunerative. It is desirable that a modest beginning should be made, and the scope of the Institution should accordingly be restricted for the present to teaching drawing, as recommended by Mr. Chisholm in his pamphlet, bleaching, dyeing, and calico-printing, and carpentry. The course of instruction should combine theory and practice so as to turn out a more skilled artisan than at present.
>
> Along with this Central Institution *(Kalā Bhavan)*, dyeing schools should be opened in the districts at places to be fixed by the Department, on the model of those which are shortly to be opened at Surat and Ahmedabad, under Mr. Gajjar's supervision.
>
> The workshop in the Khangi Department should be utilized in teaching carpentry to the pupils of the institution, without interfering with the existing arrangements. The mode of operation should be fixed by the Department in consultation with the Khangi.

The management of the Central Institution and the District School should be entrusted to Mr. Gajjar, who must be spared from the college for the purpose. The institution should be attached to the Department of Vernacular Institution. But considering the novel nature of the experiment, it is desirable that its management should be as little divided as possible. It is accordingly directed that the Department should, as early as possible, frame a budget for the new institution and District Schools, and that when that is sanctioned, Mr. Gajjar's hands should be left unfettered in regard to the details of internal management, including setting of curriculum, appointments, formation and maintenance of laboratories, within the limits laid down by the budget. The responsibility of making the experiment a success should rest on Mr. Gajjar, and he should be invested with powers proportionate to his responsibility. He should submit an annual printed report to the Director of Vernacular Institution regarding the management and expenditure of the Institution. He is expected to exercise rigid economy consistent with efficiency.

A suitable building for the institution should be fixed. The Department should give effect to the above as early as possible[34].

(VII)

The School of Technology *(Kalā Bhavan)* was formally inaugurated in April 1890. As its Principal, Gajjar planned the developmental activities, including establishment of the laboratories and the appointment of faculty members. The faculty included a German Professor, Dr. Ehrhardt, who taught Chemical Technology.

Kalā Bhavan was divided into seven 'schools': (1) School of Art to teach drawing, modelling, and sculpture. (2) School of Architecture. (3) School of Mechanical Technology. (4) School of Chemical Technology. (5) School of Pedagogy. (6) School of Agriculture. (7) Practical School[35].

The staff of the *Kalā Bhavan* consisted of: (1) Principal, (2)Professor of Dyeing and Calico-Printing, (3) Professor of Literature, (4) Professor of Agriculture, (5) Head Teacher in Drawing, (6) Professor of Chemistry, (7) Professor of Physics, (8) Lecturer in Mathematics, (9) Gymnastic Teacher, and (10) Laboratory Assistant. Besides these, there were Assistant Masters, Demonstrators, Foremen, Mistries, a Gujarati Teacher, a Marathi Teacher and a *Śāstrī*[35].

The *Kalā Bhavan* had captured the imagination of the prospective students even before its formal inception. They had started making enquiries about the courses and the 'future prospects'. Gajjar recorded that this was natural in view of widespread dissatisfaction with the existing system of education and the demand of the students for practical training.

The *Kalā Bhavan* was thrown open to all those who possessed knowledge of reading, writing and arithmetic. Nevertheless, admission was not very easy in view of

the large number of pupils seeking admission. Gajjar, therefore, decided to conduct a written test. To his surprise, as many as 814 pupils, including 122 from the artisan castes, flocked at the 'campus' on 27 August 1891 for this test; in the absence of suitable buildings this was conducted under the tents. The academic background of the students was as follows:[35]

Matriculation	English VIII Std.	English VI Std.	English V Std.	English IV Std.	English III Std.	Gujarati Marathi VI Std.	Lower Grade Students	Total of Students
3	39	34	65	61	54	233	225	814

Out of 814 candidates, 242 got selected. As the Baroda Administration Report for the year 1891-92 states:

'Mr. T.K. Gajjar, M.A., B.Sc., continued to be in charge of this useful institution, which acquired so much popularity that there was a considerable influx of students during the year'.

To start with, the *Kalā Bhavan* offered a three-year Diploma Course. There was also a provision for short-term certificate courses. The report for the year 1891-92 states that the School of Chemical Technology succeeded in turning out students whose services were engaged by merchants from Calcutta, Cawnpore, Delhi, Amritsar, and by mill owners[37]. The Report added that the new Calico-Printing Machinery ordered from Messrs Edmerston and Co. of Manchester, was fixed up. More equipment was added to the dye-house and a room was fitted up for quantitative analysis. The carpentry class started functioning in 1891 and taught physics, drawing, modelling, carpentry, building construction, etc. Most of the artisan boys took advantage of this class and learnt to do 'accurate work within a few months'[38].

The School of Mechanical Technology was more popular. The Report for 1892-93 states that this was because of the latest laboratory equipment available. A small Instrument-making Department was also formed in which several machines and apparatuses were manufactured.

With regard to the School of Chemical Technology, a large fresh stock of chemicals was ordered out in 1892 and tramping and soaping machines were added. Calico-Printing was taught and Turkey-Red dye was manufactured on a large scale.

The practising school made considerable progress. This was reported in the following words:

'Important changes were introduced during the year. Drawing, which has been quite an essential feature in European Schools and English as second language, were introduced. The old methods of teaching grammar, arithmetic, geography, and history were swept away. Grammar was taught analytically, arithmetic was connected with the notions and not merely the words of numbers; tables reduced, and in geography and

history efforts were made not only to impart a knowledge of phenomena, but also of the causes of the phenomena'[39]

The *Kalā Bhavan* held an exhibition in March 1895.This gave a wide publicity as a large number of inhabitants of Baroda City and people from countryside visited the exhibition. The following year the *Kalā Bhavan* took an important decision.It established District Industrial Schools at Patan, Vaso, Petlad and Kathore. This must have greatly benefited the rural people.

The *Kalā Bhavan* was set up with specific objectives — to turn out self-employed entrepreneurs and to create skilled technicians in response to the needs of the modern industries. The students were, therefore, required to attend lectures, read relevant books, do experiments, and work at the workshops. The year 1897 witnessed the opening of the weaving class. Its objective was to introduce the 'fly-shuttle arrangements in the ordinary handloom in use in this country'. A watch-making class was added probably to turn out watch repairers.

The existing reports show beyond doubt that the *Kalā Bhavan* created an educational infrastructure to cater to the needs of the modern industrial sector.This centered round the textile mills and the ancillary industries. The students performed experiments for preparing oxalic acid, a substance useful in the dyeing, calico-printing and washing process. They also produced a colouring substance, called cosine, used in producing pink colour on all sorts of yarn. The instructor who taught dyeing wrote in 1899:

'Experiments for manufacturing soda carbonate according to Solway process, also called Ammonia Soda process, were also made in the laboratory and a sample containing about 25 per cent of sodium chloride was prepared. The importance of this substance in the manufacture of glass and soap, combined with its immense use in the dye-house, has led me to perform several experiments for manufacturing it. One of the students of this school who has passed in the cotton dyeing examination of *City and Guilds* of London Technical Institute is at present manufacturing bar-soaps, much used in the mills, for a soap dealer in Bombay'[40].

Students of *Kalā Bhavan* were suppposed to perform laboratory experiments and use the institute's workshops as a part of their training programme. At a time when the Indian handicrafts industry was rapidly declining and the modern sector was seriously handicapped, students acquired knowledge of manufacturing safety-matches, glass, dyes and colours, brushes, nibs and buttons, woollen carpets and a number of useful consumer goods, which India had been importing from foreign countries.

The Maharaja held the view that instruction at *Kalā Bhavan* should be imparted in the regional languages, namely Marathi and Gujarati. Gajjar held similar views. He once wrote that unless technical knowledge was made accessible in the mother tongue, a large mass of men would be absolutely debarred from sharing the economic and intellectual

opportunities[41]. This belief was based on the consideration that a large number of students from the surrounding rural areas were to be encouraged to join *Kalā Bhavan,* and they could not be expected to be proficient in English. In 1896, out of the total number of 204 students, 39 belonged to the artisan castes, and 44 were farmers and cultivators[42]. The Maharaja put Gajjar in charge of the *Sayaji Gnyana Manjuṣā* project for creating and developing technical literature in Gujarati and Marathi and gave a handsome donation of Rs.50,000.00 for this purpose. Gajjar assumed a leading role in the translation movement. As a general editor of the *Sayaji Gnyana Manjuṣā* series, he served as a link between the *Śāstrīs* and the translators on the one hand and the Department of Education on the other. To establish a uniform system in rendering technical terms, Gajjar studied philology. With the help of the *Śāstrīs* and philologists, Gajjar coined new technical terms, and got several works translated from English into regional languages. 'The revolving shelf containing eighty large folio volumes', Gajjar wrote, 'had been studied by me and the monument of Herculean task was performed by me as a labour of love'[21]. By the end of 1892, books on physics, chemistry and linear perspective were ready for publication. The following year, technical terms were fixed for most of the sciences. By July 1894, works on Agriculture, Heat, Arithmetic, Practical Chemistry, Mechanics, and Steam were published. The Professor himself wrote and translated several works and published them[43]. The official sources provide very valuable information. They state that under the auspices of the *Sayaji Gnyana Manjuṣā* Project, seven books were published, 16 were sent to press, and 57 manuscripts were ready for publication[44]. Gajjar also started a scientific journal, *Ras-Rang Rahasya,* in 1894.

Kalā Bhavan, indeed, made remarkable progress under the leadership of Professor T.K. Gajjar. The progress was rapid enough to lead Alfred Webb, President of the tenth Indian National Congress (1894), to speak at his public farewell address at Bombay:

'Scarcely anything gave me greater pleasure in India than a visit I paid a few days ago to the admirable technical school at Baroda. We have nothing at all equal to them in Ireland. They are thoroughly practical in their conception, and scope'[45]. Mr. Chastfield, Director of Public Instruction, Bombay, expressed similar sentiments when he observed in his official minutes that the *Kalā Bhavan* 'promises to solve the question of Industrial Education of India'[21].

That the above remarks were not based on superficial observations can be shown by the fact that the students acquired proficiency in the manufacture of glass, dyes and chemicals, carpets, acids, safety-matches and a number of other products. More importantly, they could also produce Turkish-Red dye, considered to be a 'trade-secret' in those days. The schools of Mechanical and Chemical Technology were equipped with the latest instruments and laboratory equipment. Official sources state that the students turned out by *Kalā Bhavan* were absorbed by the industrial establishments at Calcutta, Kanpur, Delhi, Ahmedabad, Bombay and Amristsar. 'During the 25 years of its career', the Baroda Economic Development Committee proudly recorded, 'the *Kalā Bhavan* has sent out nearly a thousand graduates fully trained in the various arts and industries. It has supplied a large number of Mechanical Engineers, Dyers, Weavers, etc. to Gujarat and Dyers specially through the whole of India. The dye-houses now

established, large and small, have most of them got their inspiration and guidance from the dyeing school of the *Kalā Bhavan*. Professor Gajjar, who was very keen on the promotion of chemical industries, by his own work and with the help of Professor Schumacher and Dr. Ehrhardt who were brought from Germany to work on the *Kalā Bhavan* staff, organized a very successful School of Chemical Technology, which has been supplying dye-house chemists to the country for the last many years'[46].

The Tata Group employed *Kalā Bhavan* students in the weaving, dyeing and bleaching plants of the Empress (Nagpur) and the Swadeshi (Bombay) Mills, Gajjar himself being a Tata Consultant. He allowed his students free access to his laboratory. "The students are prepared in my private laboratory", Gajjar remarked, "and after having acquired skills in the manufacture of dyes and chemicals, they go as far as the Punjab to impart skills to others"[47].

The *Kalā Bhavan* set new standards in yet another direction. The Society for the Preservation of Indian Art, London, invited the *Kalā Bhavan* to participate in the Empire of India Exhibition. At Gajjar's recommendation, the Baroda Government sent two mistries of the *Kalā Bhavan*, Lallubhai Mansukhram and Bhaichand Ghelabhai, to London. The *mistries*, belonging to the artisan castes, were thoroughly ignorant of English language, but they proceeded to England in May 1895. Their exhibits won high acclaim of the visitors, including members of the Royal Family of England[48]. This was a new phenomenon; earlier only members of the privileged castes had visited that country[49].

Kalā Bhavan was a product of Gajjar's initiative. He worked hard for its development and expansion. 'I had to work round the clock', he once wrote, 'and I liked my work'[21]. The end, however, turned out to be tragic, leading the Professor to resign his job. As noticed earlier, Gajjar had been entrusted with full authority to develop the institute the way he thought fit, and he often spent large amounts for placing orders for machinery, laboratory equipment and chemicals with German and British firms. Gajjar was uneasy with sloppiness and he held that money should not come in the way of rapid progress.He had once quoted Huxley.

"There is a well-known adage that those who set out upon a great enterprise would do well to count the cost. I am not sure that this is always true. I think that some of the very greatest enterprises in the world have been carried out successfully, simply because the people who undertook them did not count the cost; and I am much of opinion that in this very case, the most instructive consideration for us is the cost of doing nothing"[50].

The confidence reposed in Gajjar and the power which he had been vested with, were bound to lead to confrontation with the State Bureaucracy; the latter had its own way of functioning. For one thing, the Maharaja, both by training and disposition, was meticulous in maintaining official procedures, though he would not mind large expenditures on projects, once they were approved.

On several occasions, Gajjar's ways of incurring expenditure and his methods of dealing with several departments were challenged. For instance, in April 1893, one Anandrao, a clerk in the accounts department, had warned Gajjar that 'the charges (expenditure) are out of proportion to the quality and quantity of the work, and certainly require pruning'[51]. He asked Gajjar to send a revised bill.

Such incidents were not uncommon in Baroda State which, as the available records show, had almost a fascination for details and correspondence. That Gajjar was required to enter into correspondence with various departments for the minutest details could be seen from the volume of his own letters preserved in the Baroda Archives. This was only a procedural matter which none, including the top officials, could escape. This was not all. Gajjar came to be challenged on each and every issue and this got on his nerves. 'I had three great enemies to contend with', Gajjar noted in his diary, 'namely, the educational, the public works, and the Khangi Departments[21].

He felt strongly that the cooperation of these departments was essential for the all-round progress of the polytechnic. The Department of Education could absorb the students trained at *Kalā Bhavan*. The Public Works Department could similarly use the products of the institute, but this was not the case, and Gajjar felt that the three departments were getting jealous at the rapid rise of the *Kalā Bhavan*. To make matters worse, Rao Bahadur Rajnikant Ray, the Financial Advisor to the Baroda State, recommended the government to hand over the P.W.D. to the *Kalā Bhavan*, to the chagrin of these departments, and this aggravated the matter.

The result was predictable. The P.W.D. now joined hands with the Education Department. The Education Department took the lead when it suspended the activities of the *Sayaji Gnyana Manjuṣā* project. Gajjar, however, personally met the Maharaja and succeeded in saving the situation. But eventually, according to Gajjar, "my enemies had an upper hand. They got the order passed for curtailing the budget. The accounts were audited too severely and 'every article upto a pin was checked'[21]. The archival records at Baroda specify the following charges against Gajjar[51].

1. For the first three years the debt incurred during the previous year was paid in from receipts and fresh debt incurred every year in excess of the limit on the sanctioned amount of advance. This system was changed without reference to the government and the money was drawn every year without returning previous balances or accounting for them. This violated a well-established procedure.

2. The rules for preparing the workshop accounts as prescribed by the Huzur orders were not adhered to, with the result that the accounts showed profit, whereas the accounts prepared under the prescribed rules would have shown losses.

3. The State money was risked in buying bazar hundies for transfer of money to Bombay, instead of sending it by cheque on the Bank of Bombay in the usual way, for which Gajjar had no powers.

4. Instead of returning the proceeds from the sale of the articles produced by the workshops to the Royal Treasury and charging money from the treasury for purchases, as the rules required, the sale proceeds were directly used to meet the expenses.

5. Huzur orders gave powers for internal management within the limits laid down by the budget, requiring sanctions to be obtained for any transfers of money made in recent years. The powers given to Gajjar for internal management within the limits of the budget did not mean that the government had no right to enquire into how he used his powers.

These charges and frequent interference of the bureaucracy exasperated Gajjar. He had worked tirelessly without any financial gain. 'With all my work and responsibility', he noted in his diary, 'my salary continued to be the same (Rs.250.00 per month), as I was drawing at the Baroda College. Professor Masani who joined the College with me on the same terms has risen to a double the salary which I got'[21]. He did not mind this very much, but the bureaucratic intransingence was too much for him to bear. 'This educational institution', he noted with frustration, 'which I had nurtured with my life blood was being crushed under the foot of the unscrupulous officers'[21]. The Professor was a man of simple habits but high self-respect and he resigned from his job on 12 July 1896 with a vow never to visit Baroda in future. By this time, however, the institution had carved out a niche for itself accruing at the same time benefits to the artisans and other backward caste people[52].

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