

**TRIBHOVANDAS KALYANDAS GAJJAR (1863-1920) – PIONEER  
INDUSTRIAL CHEMIST OF INDIA**

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Professor Tribhovandas Kalyandas Gajjar (1863-1920) played an important role in grooming, motivating and inspiring the manpower for the spread of technical education and chemical based industries in western region. He was instrumental in development of Kala Bhavan & Alembic Chemical Works at Baroda, and Techno-Chemical Laboratory at Bombay.

**Introduction**

The name of T. K. Gajjar is often cited for his bringing out awakening about chemical technology and catalysing the spread of chemistry based industry in the western part of India, which had bearing on pharmaceutical manufacture. However, there was hardly any documented coverage available, almost none in the languages other than Gujarati, on this pioneer industrial chemist and technologist. The only reliable source which came to notice was a biography of Gajjar in Gujarati, first published in 1958, of which the second edition was brought out through the Maharaja Sayajirao University, Baroda, in 1970. Some information of interest could be gleaned from a couple of publications on the Alembic Chemical Works Ltd.

This writing has been prepared largely on the basis of the material derived from the above sources and is scripted under the subtitles: Early Life and Education; Kala Bhavan; Techno-Chemical Laboratory; Alembic Chemical Works; and Persona, Later Life and Legacy.

**Early Life and Education**

Tribhovandas' ancestry was of carpenters known as '*suthars*' or '*gajjars*.' The well reputed Gajjar family members settled at Ahmedabad were traders of

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**Tribhovandas Kalyandas Gajjar<sup>9</sup>**  
**1863-1920**

woods and also building contractors. At some stage the family moved to Surat, where Tribhovandas was born on 3 August 1863.<sup>1</sup> He was the youngest son of Kalyandas and Fulkorben.

Tribhovandas had his early education at Surat. From his childhood he had keenness for studies. After completing his education at Gopipura Middle School, he joined Surat High School. He had greater interest in science subjects, mathematics in particular. Outside the school hours, he would spend time at a factory which the family owned and watch working of machinery. He passed his matriculation in 1879 with high grades.

For further studies Tribhovandas moved to Bombay, where he joined the Elphinstone College and obtained B.Sc. degree in 1882. Immediately after that, he worked as junior fellow in 1883 and senior fellow in 1884. During his fellowship he used to teach physics and chemistry. He qualified for M.A. degree in 1884 with chemistry as the principal subject. He was favourite student of Dr Lyan, learned professor of chemistry. Tribhovandas lost his wife in 1883 which took him quite a while to recover from the bereavement.

At some stage Tribhovandas wanted to go for engineering and for that he started studying mathematics. He also attended classes at the Grant Medical College to learn about types of medicines, their testing, characteristics and functions. In 1885 he began to study law, but left it incomplete because of his lack of interest.

Gajjar matured to possess keen interests in science, industry and literature. His inclination towards development of industry remained paramount. In his personal notes, he once wrote:

‘Though I have studied science, what is use of that knowledge if it cannot be utilized in practice. It is not sufficient for me to only know science; I must use it for benefit of mankind. I must put all my knowledge and capabilities to the use of my nation. The country needs factories run with scientific methods. These factories should produce goods on a large scale from the raw material. At any cost the wealth of the country should remain within it. I will use my knowledge for developing industries in the country and it is my ultimate goal.’

The young Tribhovandas brimmed with idealism.

### **Kala Bhavan**

He joined as teacher of chemistry at the Baroda College in 1886. He chose Baroda as the place to work because he knew that Maharaja Sayajirao Gayakvad was fond of developing industries. Gajjar worked hard to develop the college as a well equipped chemistry laboratory.

Tribhovandas was a man of ideas. It was said about him that ‘Gajjar woke up every morning with the idea of a new project.’ Gajjar had written an article on the scheme of imparting professional training, which he developed into his ‘Notes on National System of Education for Baroda State.’ He firmly believed that general education should precede professional training. Education up to fourth Gujarati standard should be made compulsory. In the higher standards, general education and professional education should be on par. Thereafter, higher professional education should match the study of college level degree course. Gajjar’s friend Athale brought the views which Gajjar projected to the notice of Sayajirao Gayakvad.

There were different developments in between before the Baroda State government projected to start a new institution by the name Kala Bhavan, to

provide industry oriented training to students, with a view to provide setting up industries in the State. Ultimately in March 1890 order was issued to open Kala Bhavan, with specific mention that entire responsibility of running the institution would be entrusted to Gajjar and he would get all the encouragement and freedom to run it. Professor Gajjar planned, equipped and commissioned working of the Kala Bhavan. The institution was launched in August. There was very encouraging response for the admissions.

The Kala Bhavan had polytechnic kind of structuring. The institution had six divisions: (1) Drawing, (2) Sculpturing and Engineering, (3) Workshops, (4) Chemical Analysis and Dyeing, (5) Agriculture, and (6) Language and Teaching. The medium of instruction was Gujarati, with English as second language. This diploma institution proved to be a successful venture.

The Kala Bhavan which he groomed and stabilised had grown to become Faculty of Technology and Engineering of the M. S. University of Baroda as of now. There is Professor Gajjar Hall for the residence of the students.



**The Kala Bhavan as of now at the M. S. University of Baroda<sup>9</sup>**

An incidence where Gajjar's expertise worked, when others' had failed added to the popularity of the Bhavan. A candidate having been rejected for an army job, blackened with coal tar, the head of the marble statue of Queen Victoria, erected at the Esplanade Ground in Bombay. Various steps taken to remove the stains fully remained unsuccessful. Finally Gajjar was offered to do the job. He worked very hard on it and succeeded in the task in about three months. The details of how he accomplished this were published in the 5 September 1898 issue of the *Times of India*.

Having succeeded in restoring original sheen to the tarred marble statue, Gajjar thought of evolving a process for cleaning pearls chemically. He developed a simple method for the purpose; gradually this was proved to be a money making proposition.

The Kala Bhavan progressed well but unfortunately there arose some bickering against Professor Gajjar for the credit which came to him for success of the institution. This disturbed him and he after heading the Kala Bhavan for about a decade, in 1899 said good-bye to the institute and Baroda and moved to Bombay.

### **Techno-Chemical Laboratory**

At Bombay Gajjar joined the Wilson College as professor of chemistry. He opened a private laboratory in 1899 in a small room of the College and started doing chemical analysis professionally. With the fair amount of money he earned from cleaning pearls, he could develop his laboratory in a short time. He resigned from the Wilson College and concentrated all his energy on the laboratory. In 1900, he shifted the laboratory to an independent building in Girgam. That is how the Techno-Chemical Laboratory started. It was privately owned by Gajjar.

The prime objective was to impart education to the youth in the subjects of industrial production, pharmacy, mining, metallurgy, agriculture and other chemical related trades and businesses. The goal was to establish chemical industries on a large scale in the country through development of education and research in the field of chemicals.

The Laboratory became an institute of its own kind. The equipments and facilities in the Laboratory were of top quality. On recommendation of visiting

committee, the Bombay University in 1906 accorded recognition to the Laboratory for the study of chemistry at M.A. level. It is noted that in 1908, the institution had 257 students on its rolls.

The Laboratory attracted students from all over the country. Apart from comprehensive knowledge of chemistry, the Laboratory imparted teaching in mathematics, German language and chemical engineering. Gajjar himself was an expert graphologist and worked as a professional. Sakalchand Jethalal Shah who became a well known graphologist was Gajjar's student and close colleague.

Among Gajjar's students the names of Anand Shridhar Kotibhaskar and Bhailal D. Amin stand out. A mention may also be made of G. S. Agashe, who became an academic and served as principal of newly created University of



**Anant Shridhar Kotibhaskar**



**Bhailal D. Amin**

Adyar, Madras.<sup>3</sup> Professor Gajjar is credited with fathering technological education in Bombay Presidency in colonial days.

Professor Gajjar played a vital role in preparing students for M.A. of the Bombay University up to 1909. Later, as it became necessary for him to pay more attention to the Alembic factory, the working of the Techno-Chemical Laboratory slowed down. The Laboratory remained partially functional till 1922 when it stopped operation.

### **Alembic Chemical Works**

Gajjar contributed much to the development of industries, a subject which was very close to his heart in the western region, the Bombay Presidency. It was on his advice and direction that dyeing houses were established for the mills at Surat and the students trained by Gajjar were employed to run those. The most important was the unit which emerged as the Alembic Chemical Works. A mention may also be made of Lotus Soap Factory, Bombay Lac Works and Progress Dye Works.<sup>1</sup> Standard Chemical Works at Bombay was the other concern established by him.<sup>4</sup>

On the basis of the information that has become available, the story of the start and operation during early years of the Alembic may be constructed.<sup>1, 5, 6</sup> Gajjar was the genius and influence at the back of the enterprise. He is considered to be one of the original founders of the company. The others being his students Anant Shridhar Kotibhaskar<sup>7</sup> and Bhailal D. Amin.<sup>8</sup>

Kotibhaskar who was Gajjar's favourite and bright student started a small factory known as Parel Laboratories, Bombay, in 1903 to manufacture tinctures. Gajjar invested fifty thousand rupees in this venture. Within a short period the factory became famous for the standard medicines it produced. Alcohol was the essential item for preparing tinctures, which was produced by the company itself. Kotibhaskar thought that compared to Bombay, he would have better facilities at Baroda for producing alcohol. With Gajjar's concurrence a small distillery was set up at Baroda in 1905. Later, both the firms were merged to form the Alembic Chemical Works at Baroda. Now Bhailal D. Amin also joined hands with Kotibhaskar. With Gajjar's reputation and credit it became easy to raise a capital of five lakhs of rupees in a short time. The firm became a limited liability company in 1907, registered first at Bombay and then at Baroda. Kotibhaskar and Amin were appointed as managing directors of the company and Gajjar was appointed as the consulting technical director. Now it was the Alembic Chemical Works Company Limited.

The main object of the Company was to develop in India industries based upon chemical technology in general and involving the use of spirit in particular. It was for this reason that the company carried the name 'Alembic,' the word referring to an apparatus formerly used in distillation.

For modernising operations of the Company Kotibhaskar proceeded to Europe in 1908, returning in 1909, to purchase machinery and to get the necessary experience of distillery and pharmaceutical work in England and the Continent. French distillery plant for the distillation of rectified spirit and machinery for pharmaceutical purposes were brought and installed at Baroda.

This was the time when the Baroda State revised its excise policy and decided to have one contractor for manufacturing and supplying spirit for Baroda. Through the initiative taken by Kotibhaskar, the Company was able to get distillation contract from the Government of Baroda for the manufacture and supply of spirit to the State. Kotibhaskar was confident that the French still would be able to produce the whole quantity of the spirit required. The *Mahura* flowers used as raw material were available in the nearby places.

The Company got the contract in February 1910, but soon after Kotibhaskar was taken seriously ill. His health started deteriorating. According to terms of the contract the supply of the spirit was to begin from 1 April 1910, there was no time to loose. In these circumstances Gajjar had to rush to Baroda to carry on the work left incomplete by Kotibhaskar. He had his own health and domestic problems but the professor toiled hard. Finally, the distillation could begin from 16 April and supply of the spirit started on 26 of the month, with the State accommodating for the delay on account of the difficulties the Company faced. The experience and perseverance of Gajjar paid, the company was saved from losing its prestige.

To cope with abnormal increase in demand, the Company had to instal in the works in addition to the French plant, a new plant known as Baroda Distillery Plant. For the purpose of distilling concentrated spirit, Gajjar invented a still of his own by use of which strong spirit could be obtained in one operation, rendering re-distillation unnecessary. Gajjar also effected other improvements in the production process.

The Alembic Chemical Works Ltd which started as manufacturers of alcohol and alcohol based galenicals, with passage of time developed into a major drug manufacturing house with diverse activities. The credit for its founding and grooming goes to the vision of Professor Gajjar and his students A. T. Kotibhaskar and B. D. Amin, with the latter serving it through difficult times for several decades when Kotibhaskar and Gajjar had gone from the scene.

### **Persona, Later Life and Legacy**

Tribhovandas Gajjar was a person of medium physical height (5'-5'6") having wheatish complexion and maintained a good health during his childhood and youth. He was a teetotaller. The professor was sweet natured, candid and slightly short-tempered. He was caring for his friends and students.

He had an excellent private library. In addition to science he had interest in other subjects also. Gujarati was his mother tongue which he loved immensely. He had good command on English and German. He kept contact with men of literature in Gujarat and also had close association with learned luminaries of Bengal. He was made a member of the Nagri Pracharni Samiti by the Banaras Hindu University.

After putting the Alembic on the tracks he moved to Surat. With a laboratory at home he had a desire to start research institute at Surat. But a recession hit the pearl market and cultured pearls came in vogue. The importance of genuine pearls diminished. Thus, the most important means of private income for Gajjar, apart from Alembic Chemical Works, ceased. Even Alembic did not make sufficient financial progress during his lifetime.

Physically, he was not in good health and suffered from dysentery. For court cases he had to spend time and energy. He felt disturbed on losing his student and colleague Kotibhaskar. His second wife also passed away. His so-called friends and colleagues also deserted him. All this affected his mental health. His solicitor and also a friend, by the name Mahervanji, advised him to leave Surat and go to some other place within the country or abroad for a change. In a letter from Surat to Mahervanji dated 21 June 1918, Gajjar stated,

'you advise me to leave Surat, but I cannot do so till I make proper arrangement to look after my business here. I very much want to go to Calcutta. Sir Asutosh Mukherjee asks me to go there to transform the scientific institute, which has been established there with huge donations, into an industry. Moreover, Madan Mohan Malaviya insists that I should join Banaras Hindu University which has been set up according to my plan. But I cannot leave Surat at this time.'

Apparently, the stature of Gajjar as a scientist had not diminished.

The health of Gajjar deteriorated day by day. To make matters worse, he became victim of insomnia. The last few years brought much distress and pain in

his life. When he was in this pitiable state of health and mind he had a chance meeting with Mahatma Gandhi, who consoled the restless and shattered Gajjar and said,

“You have done a lot for the country. Now try to spend rest of your life in peace.”

Gajjar passed away on 16 July 1920.

A pioneer of industrial chemistry and technology in India, Tribhovandas Gajjar was gone, but he left a rich legacy behind. Gajjar revolutionised the dyeing and printing industry in India and trained many experts in dyeing capable of conducting and managing large dye-houses. The very healthy state of the drug industry today in the western region of India owes a deep debt of gratitude to the spadework which Professor T. K. Gajjar carried out in the distant past.

Gajjar developed topical anti-infective iodine trichloride which was used for controlling epidemics of plague, cholera and influenza.<sup>4</sup>

He was an enthusiastic advocate for use of Gujarati in imparting education. Gujarati was made the medium of instruction at the Kala Bhavan. He coined technical Gujarati words in chemistry and thus helped in enriching the language.

Professor Gajjar gave an important deposition of higher education and research before the Commission appointed by the Government and the Bombay University by taking active interest in the administration of the Bombay University. He played an important role especially in preparing courses for students in science and chemistry.

He also contributed much towards education for women. He believed that the prime objective of women's education is to prepare housewives. It was a home science education he had in view. He played an active role in the establishment of Vanita Vishram, which initially started operation at his father's house at Surat. The institution progressed rapidly and later in 1912, a branch was opened at Bombay.

There is a need to institutionalise the name of Professor Tribhovandas Kalyandas Gajjar at the national level as a well known industrial chemist in India.

### Acknowledgement

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### References and Notes

1. Ashwin M. Trivedi, Sakalchand J. Shah, and Raskilal K. Shah, *Professor Tribhovandas Kalyandas Gajjarni Jeevankatha*, M. G. Institute, Ahmedabad, 1958. Sakalchand J. Shah was a close disciple of Professor T. K. Gajjar. He had penned life sketch of the Professor. The M. G. Institute, Ahmedabad invited him in 1951, to deliver a lecture on Gajjar. A. M. Trivedi and R. K. Shah of the Institute got motivated to collect more of source material of relevance on the professor. They could get 30 files and personal notes of Professor Gajjar from his son Dr Krishnalal Gajjar. The material drawn from these files and notes and his life sketch by Sakalchand made publication of this book possible. In 1970 second edition was brought out as Shri Sayaji Sahityamala Book 327 by the Prachya Vidya Mandir, Maharaja Sayajirao University, Baroda, (pp 176). An English translation from the original in Gujarati was got prepared for the present writing. Earlier translation of selected pages by M. R. Shastri were received.<sup>2</sup>
2. Shastri, M. R., *personal communication*. He retired as Director, Drugs Control Administration, Government of Gujarat, Ahmedabad (1975-78).
3. Obituary, Gnesh Sukharam Agashe (1886-1921), *Journal of Chemical Society, Transactions*, 121 (1922) 745-746.
4. Gajjar, T. K., A short note published on centenary of his birth, *Indian Journal of Pharmacy*, 25 (1963) 310.
5. Amin, B. D., *The Rise and Growth of the Alembic Chemical works, A History*, 1939.
6. *The Alembic Story*, 1907-57.
7. A. T. Kotibhaskar (1877-1910) was born at the village Biravadi of Kolaba area. He graduated from Ferguson College, Poona. He obtained his M.A. degree in chemistry from the Bombay University in 1902, receiving Chancellor's gold medal. He briefly worked as professor in the Victoria Jubilee Institute, Bombay. He joined the Gajjar's Laboratory. He studied the vapourised oils, aromatic substances, alcohol, etc. under the guidance of Professor Gajjar. With the professor's help he made large scale experiments for starting of chemical industry on the use of spirit. He also succeeded in developing process of glass enamelling.
8. B. D. Amin, B.A., M.S.C.I. (1878-1950) had an industrial bent of mind. He looked after business part of the firm. His management skill and tact greatly helped the Company. Later he became the managing director. He got the title of Raj Mitra.
9. The photos courtesy of Professor R. K. Goyal, Vice-Chancellor, M. S. University of Baroda.