Sands of Time

Tata Central Archives Newsletter

VOL. XIII, ISSUE 2, 2015

THE GIGANTIC TATA HYDRO-ELECTRIC SCHEME

Hydropower – a renewable energy source where power is derived from water moving from higher to lower elevations, thus creating energy.

Way back in 1901, Jamsetji Tata dreamt of generating hydro-electric energy from water flowing down the Western Ghats. However, Jamsetji passed away in 1904 and it was left to his two sons Dorab Tata and Ratan Tata and his trusted lieutenants Burjorji J. Padshah and Ardeshir J. Bilimoria to complete the project.

The Tata Hydro-Electric Power Supply Company Limited was registered on November 7, 1910. This project was a major hydro-electric undertaking in India and the enormous quantity of water that would be stored by the dams, constituted one of the largest of its kind in the world.

His Excellency, Lord Willingdon, the Governor of Bombay, switched on power at the Khopoli Generating Station, on February 8, 1915.

Celebrating a century of power generation in 2015, Tata Central Archives would like to share with you the history of the first hydro-electric project envisioned by Jamsetji Tata.

Jamsetji Nusserwanji Tata was decades ahead of his time when he realised the prosperity of Bombay (Mumbai) could not be secure, if it was entirely dependent on coal, brought 1,300 miles by rail or sea from the remote fields of Bengal. He hoped to make industry less dependent on costly coal and purify the environment.

In 1901, Jamsetji Tata called Nusserwanji Guzdar, a few of his senior officers and sailed across the harbour to Roha Creek. He pointed to the distant hills and said that the water from the heavy rains on the Western Ghats should not be allowed to run into the sea. He wanted to construct dams on top of the Ghats so that the monsoon waters could be collected and utilised for the generation of hydro-electric power.

Lake Sydenham and Dickinson Dam popularly known as Walwhan Lake and Walwhan Dam.

The Tata Hydro-Electric scheme visualised the construction of three artificial storage lakes or reservoirs - Lonavala, Walwhan and Shirawata located high up in the Khandala Plateau in Maharashtra. The water collected from these lakes would be brought to the edge of the plateau and led through giant penstocks or pipes to Khopoli, at the foot of the Ghats where a Power House was to be built.

The inaugural ceremony of The Tata Hydro-Electric Power Supply Company Limited, on February 8, 1911 assumed the importance of a great Bombay function. The construction work commenced with the laying of the foundation stone of the Lonavala Dam.

His Excellency the Governor of Bombay, Sir George Sydemham Clarke, laid the foundation stone; Her Excellency Lady Clarke also graced the proceedings.

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Gathered on the top of the Ghats were dignitaries from all parts of the Presidency and from other Provinces of India.

Messrs. Tata Sons & Co., as Agents for the Company, invited leading citizens to be present, and around three to four hundred accepted these invitations. They included the members of his Excellency's Council, several other senior officers of the Government, merchants, professionals and several distinguished ladies. Indeed, it seemed as though the commercial world of Bombay had come to a standstill.

Two special trains ran from Bombay to Lonavala, one leaving at 9.30 am and the second, in which His Excellency travelled, at 10.15 am. These special trains were made up of the finest rolling stock of the G. I. P. Railway and a restaurant car accompanied each train, where light refreshments were served.

Each guest received a card in advance indicating by which train he or she should travel, so that there was no confusion or overcrowding. The journey to Lonavala took two and a half hours, and on arrival, motor cars were available to convey the guests to the site of the Dam.

The huge Shamiana erected for this purpose, was brightly and prettily decorated and the air of Lonavala was cool and refreshing after the journey.

A sumptuous lunch was served by the Taj Mahal Hotel, the proceedings being enlivened by the playing of the hotel band. After lunch, their Excellency's took their seats on a raised dais, where they were joined amongst others by His Highness the Maharajah of Mysore, and His Highness the Thakore Saheb of Limbdi. His Highness the Maharajah of Bhavnagar was represented by his Dewan, Mr. Prabhashanker Pattani, CLE.

Lord Sydenham Clarke, Lady Clarke, Sir Dorabji Tata and Lady Meherbai Tata with other dignitaries at the foundation stone laying ceremony of the Lonavala Dam, on February 8, 1911.

THE GIGANTIC TATA HYDRO-ELECTRIC SCHEME...

In a loud sonorous voice, Sir Dorabji Tata then explained the origin of the Scheme.

"As the Chairman of the Tata Hydro-Electric Power Supply Company, Ltd., and speaking on behalf of the shareholders, I have the honour to request Your Excellency to lay this foundation stone, and thereby to inaugurate the works of the Company."

Sir Dorabji Tata who represented his father, Jamsetji Tata, recognised the adaptability of these regions to produce electrical energy through the utilisation of waterpower available on the Western Ghats. Jamsetji had visualised nearly thirty years before his death, the fact that cheap power could be obtained from the hydraulic resources of this country, and that the utilisation of these resources would give a great stimulus to industry.

"To my father the acquisition of wealth was only a secondary object in life; it was always subordinate to the constant desire in his heart to improve the industrial and intellectual condition of the people of this country; and the various enterprises which he from time to time undertook in his lifetime had for their principal object the advancement of India in these important respects."

Sir Dorabji Tata

As far back as 1875, in the course of his travels throughout India, when Jamsetji was looking for a suitable site for the cotton mills in the Central Provinces, he realised that the waterfalls near the Jubbulpore Marble Rocks might provide cheap power, and tried unsuccessfully to secure a concession which would have permitted further investigation.

The conception of the idea, which formed the foundation of the scheme, was due to David Gostling, a Civil Engineer of repute, who did not confine his energies to his profession, but devoted them to the service of the city.

At the end of 1897, David Miller, a member of the firm of Messrs. C. MacDonald and Co., Manchester and Bombay, was offered the option of purchasing rights connected with the Doodh Sagar Falls, near Goa.

He employed David Gostling to carry out the survey regarding the potentialities of the falls for a water-power scheme. However, in 1899 Gostling, informed David Miller and Jamsetji Tata that he had a better scheme near Bombay, in the Lonavala region. This scheme was subsequently undertaken.

In 1905, Dr. John Mannheim, of the firm of Messrs. Alfred Dickinson & Co., visited India. He was instructed to make a thorough investigation, not only of the engineering, but also of the commercial possibilities of the enterprise. His work, necessitated several visits to India, and enabled his firm to prepare all the necessary electric plans. He was retained to thoroughly investigate Gostling's proposal, to make suggestions and to advise upon the hydraulic work proposed.

The scheme was thoroughly investigated from an engineering point of view and the final plans represented the continuous work extending over many years. Here it may be useful to enumerate briefly the rare combination of advantages, which this scheme offered:

- There is a 'head' of eet, ten times as great as that at Niagara. This involves a great saving in the height of the dams;
- The rainfall is unusually high (an average of 175);
- The natural geology and formation of the valleys are very favourable to water-tight storage with a reasonable dam-wall;
- Power has to be carried over a transmission line of 43 miles only, at 100,000 voltage pressure. The transmission line offers no engineering difficulties;
- Nowhere else in India is such a ready market for so much power.

Though the feasibility of the scheme was firmly established, there remained the important question of cost to consumers. It had first to be proved that whilst paying a reasonable rate of interest upon the capital involved, electric power could be sold to the mill owners in Bombay at a lower cost than the price of steam power.

THE GIGANTIC TATA HYDRO-ELECTRIC SCHEME...

The Company was prepared to enter into contracts to supply electric power to the mills for the very low rate of 0.55 of an anna per unit, including the maintenance of all the electrical machinery, which would be installed by the Company at its own cost.

Concluding his speech Sir Dorabji Tata said: "Bombay is one of the most beautiful cities in the Empire and what a glorious city it would be if freed from smoke nuisance; thereby making it one of the healthiest."

The guests then proceeded down a covered way to the site of the Dam - a huge trench running right across the valley. On arrival of their Excellencies a number of charges were fired, which reverberated across the valley, throwing huge masses of earth and stones into the air. This followed the laying of the foundation stone.

Lord Sydenham and Lady Clarke making their way to the site to lay the foundation stone of the Lonavala Dam.

Over 7,000 workers were employed for this project. Materials were procured from almost every country in the West. There were pipes from Germany, turbines from Switzerland and cables from England. The generators were imported from USA.

The Lakes were formed by constructing masonry Dams across two valleys, the Lonavala and the Walwhan. Lonavala Lake (Lake Gostling) was mainly a monsoon lake with a catchment area of 5.4 sq. miles and a storage capacity of 414 million cubic feet.

The Walwhan Lake (Lake Sydenham) was to be harnessed with a catchment area and storage of 5.5 sq. miles and 2560 million cubic feet.

Sir Dorabji Tata, the Directors of the Company and the Engineers surveying the site of the Khopoli Generating Station.

Laying of pipelines across the stiff faces of the Ghats was a difficult task. After overcoming unsurmountable difficulties, the transmission line towers were soon visible and copper cables flashed in the sun. By 1913, nearly all the land Transmission Towers had been erected and were ready to receive the cables. Whereas, work was almost complete on the erection of the special Creek Crossing Towers in the Thane Creek. Some of these towers were nearly 200 ft. high and stood on 50 ft. foundations in the sea.

By the end of 1914, construction of the Dams at Lonavala (Clarke Dam) and Walwhan (Dickinson Dam), the Khopoli Generating Station and a receiving station at Parel, Bombay, were completed.

Lord Willingdon, the Governor of Bombay, switched on power at the Khopoli Generating Station, on February 8, 1915.

His Excellency, Lord Willingdon, the Governor of Bombay, switched on power at the Khopoli Generating Station, on February 8, 1915. The installed capacity of the Power House was 40 MW. At that time, Khopoli was the largest power station in India and the penstocks were the longest in the world.

The Shirawata Lake (Lake Willingdon) the

THE GIGANTIC TATA HYDRO-ELECTRIC SCHEME...

third of the Tata-Hydro Lakes was to be situated in a valley beyond Walwhan Lake with a catchment area of 11.0 sq. miles and a storage capacity of 6,567 million cubic feet. The Shirawata Dam (Joyner Dam), the largest Dam in terms of storage and length in the chain of the Khopoli Dams was completed in 1919-20.

The three Lakes collect rainwater in the valleys dividing the Western Ghats to ensure regular supplies for the Khopoli Generating Station.

Five 8 MW Units were commissioned at the Khopoli Generating Station between 1910-1915. In 1932, the commissioning of a sixth generating Unit of 8 MW increased the capacity to 48 MW. Between 1955-1960, the generating capacity of the Khopoli Generating Station was increased to 72 MW.

To meet the growing demand of power and to ensure efficient operations, repairs and upgradations were carried out over the years. These included replacing bolted bucket runners with integrated cast steel runners, upgrading of generator windings, replacing old breakers with superior maintenance free SF6 breakers. The entire Headworks distribution was uprated from 6.6 KV to 22 KV.

The Kundli Water Transfer Scheme started in 1997 was executed in three phases and completed in 2004. Water from the Kundli Lake was pumped through a tunnel to Shirawata Lake and used for generating power at Khopoli.

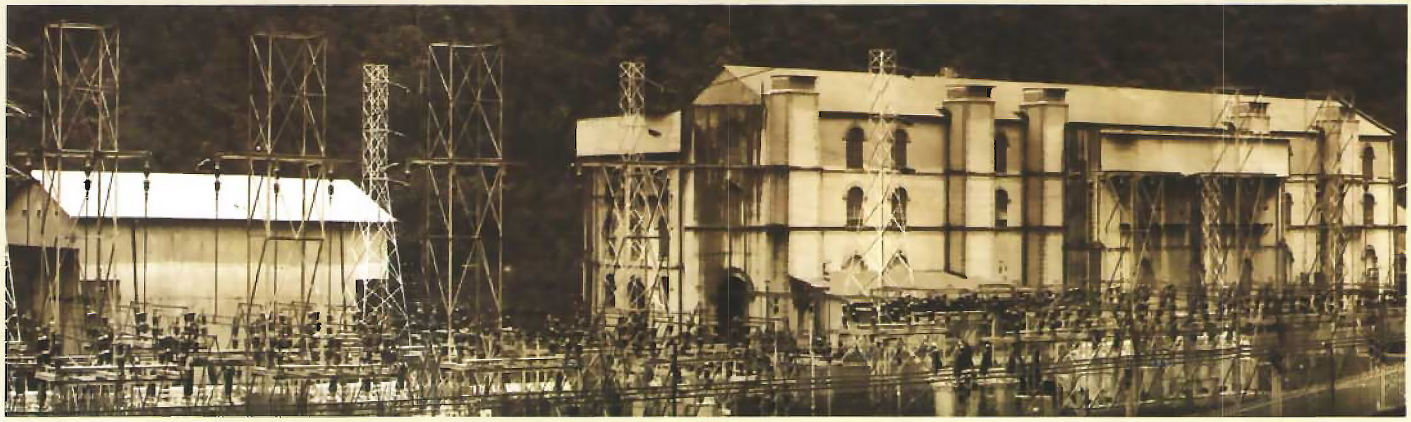
In 2001, a new Power House was constructed at the Khopoli Hydro Power Station. Initially it comprised of one 24 MW unit and in subsequent years two more

Penstocks carry water downhill from the lakes to the generating stations.

units of 24 MW were added thereby making the total generating capacity 72 MW. The power is primarily generated at the new Power House, while two units of the old Power House are on standby.

In 2000, "The Hydro-Electric Power Supply Company Limited" and "The Andhra Valley Power Supply Company Limited" merged with "The Tata Power Company Limited". As of 2015, the Khopoli Hydro Power Station utilises water from four lakes - Lonavala, Walwhan, Shirawata and Kundli and has a generating capacity of 72 MW.

The Khopoli Generating Station.



COMMUNICATING THROUGH EXHIBITIONS

J.N. Petit Technical High School, Pune.

Children shape a nation's future. To be in a child's memory tomorrow, you have to be in their life today. The world is wide and mysterious to them, as they try to piece together the puzzle of life.

Embarking on the idea of widening its outreach programmes, on the occasion of the 175th Birth Anniversary of the Founder, Jamsetji Tata, Tata Central Archives organised the first in a series of exhibitions on "Jamsetji N. Tata" at the St. Xavier's College, Mumbai, in February 2015.

The aim of this entire initiative is to inspire the younger generation, awaken their concern and love for the country, that the life of Jamsetji N. Tata exemplifies. Jamsetji was born, in an era when merchandise was carried across the seas in sailing ships or overland by horse and bullock cart. There were no railways in the whole of India. By the time Jamsetji died, railways linked city and country. The motor car had arrived. Modern industry and communications had changed the world scene.

Jamsetji Tata had himself contributed to these changes by pioneering India's steel industry; building Bombay's first modern hotel for his beloved city and planning a hydro-electric scheme, to address pollution, a malaise we grapple with today. The larger portion of his wealth was earmarked for education, investing it in various schemes for the benefit of India.

The Exhibition is divided into four sections; enterprise, education, environment and engagement, each capturing and highlighting the Founder's contributions. The Exhibition includes a guided tour and screening of the film, "Keepers of the Flame" followed by a quiz and distribution of attractive prizes.

It was envisaged that this Exhibition would be showcased in different cities in India. Carrying forward this thought process Pune was identified as the next city in which to showcase this Exhibition.

Sir Dinshaw Petit, President, Nusserwanji Manockjee Petit Charity Fund, very kindly, permitted us to organise it at the J. N. Petit Technical High School, Pune, from September 7-11, 2015.

Speaking on the occasion, Adi Engineer, Former Managing Director, Tata Power Ltd., who was the Chief Guest on this occasion, said; "Young students represent the future of this country, and they greatly need role

Adi Engineer, Former Managing Director, Tata Power Ltd., who was the Chief Guest, speaking on the occasion.

models. We are paying homage to a great patriot, to a great philanthropist, to a great son of India, and I hope that the students who come here are able to imbibe the beautiful ideals. Jamsetji Tata was a pioneer par excellence but above everything he was a nationalist and he was a patriot. To him the progress of the people of India was paramount. Industry was only a vehicle for achieving the objective of changing the future of India."

He went on to say; "I nurture this hope that such exhibitions can be held in the vernacular language. To penetrate these ideas deep into our environment, they should be in a language that is easily understood by all."

Also speaking on the occasion, Dr. Nawaz Mody, Advisor, J. N. Tata Endowment for the Higher Education of Indians said; "I am particularly grateful to Sir Dinshaw Petit, for giving this particular venue for the Exhibition. I don't think that we could have a better venue, which

COMMUNICATING THROUGH EXHIBITIONS...



Left: Speech being delivered by Dr. Navaz Mody ; Centre: Dr. (Mrs.) Archana Kalra, Principal of the J. N. Petit Technical High School, speaking on the occasion ; Right: Adi Engineer inaugurating the Exhibition.

would be accessible and known to all the schools."

Dr. Mody went on to say; "This is the second Exhibition on J. N. Tata. When the idea came up, I suggested why not celebrate the 175th Birth Anniversary by reaching out to young people. We had it for just three days in Mumbai, but we had an overwhelming response."

Dr. (Mrs.) Archana Kalra, Principal of the J. N. Petit Technical High School, reminisced about her childhood. On questioning her father as to why most vehicles had the word "Tata", did it mean goodbye? His prompt reply was "Tata is India." She went on to say; "I feel, that this is one power house of patriotism, and I think that such Exhibitions, are such a wonderful way to project to the very confused minds of today, how these people lived their lives for the country and how, they gave their all to the country."

All the predefined timeslots for the Exhibition were successfully booked for the five days. Over 1,700 students accompanied by their teachers visited the Exhibition over the course of the five days.

Guests viewing the panels on Display.

Tata Central Archives profusely thanks Sir Dinshaw Petit, the Trustees of the Nusserwanji Manockjee Petit Charity Fund, Dr. Archana Kalra; Reshma Hemnani, Vice-Principal; Zubin Lacca, Boarding Superintendent and the entire school for extending their support without which this event would not have been possible.

Seated *R to L: Mrs. Reshma Hemnani, Mrs. Adi Engineer, Dr. (Mrs.) Archana Kalra, Dr. Navaz Mody, Mr. Adi Engineer, Col. S.K. Pudumjee and Ms. Freny Shroff.* ***Standing*** *R to L: Ms. Vanessa Fernandes, Mrs. Nabar, Mr. Zubin Lacca, Mr. Nabar, Mr. Bhadur Mody, Mr. R.P. Narla, Mr. Zubin Mistry, Mr. Sohail Sayyed, Mr. Hassan Sayyed, Mr. Rajiv Adangale and Mr. Rafik Sheikh.*

COMMUNICATING THROUGH EXHIBITIONS...

An entire day of the Exhibition was exclusively allocated for the students of the J.N. Petit Technical High School.

Over 400 students from the school participated. This included day scholars from the 8th Grade and above, as well as boarders from Nursery to the 10th Grade.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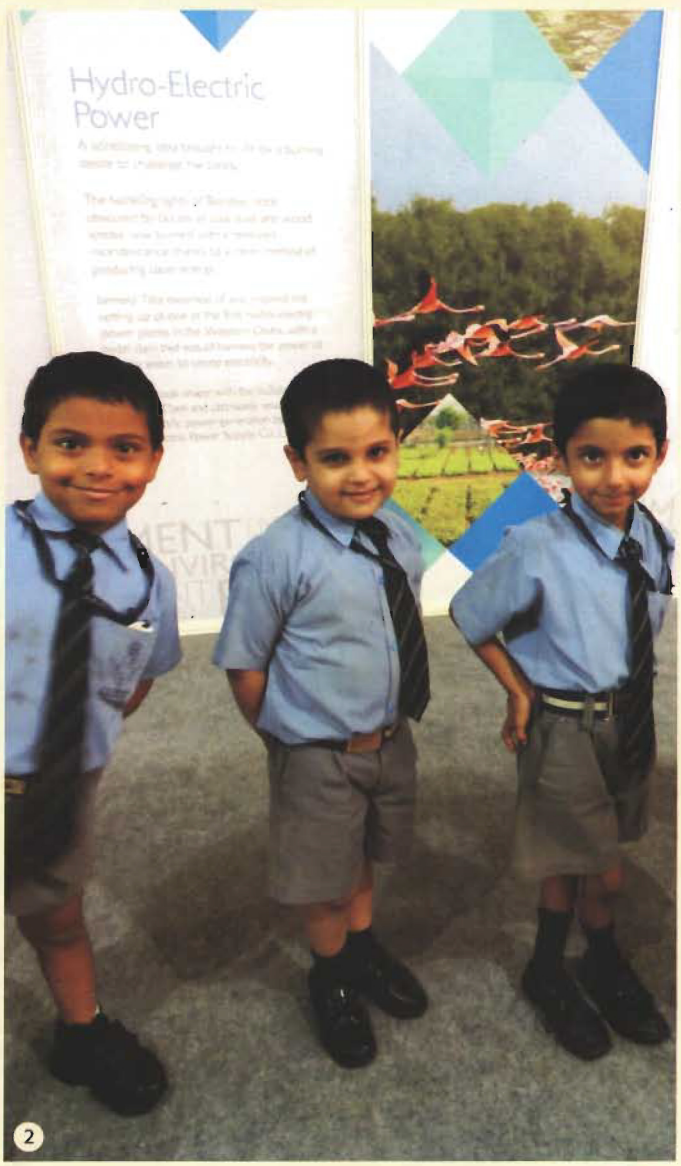

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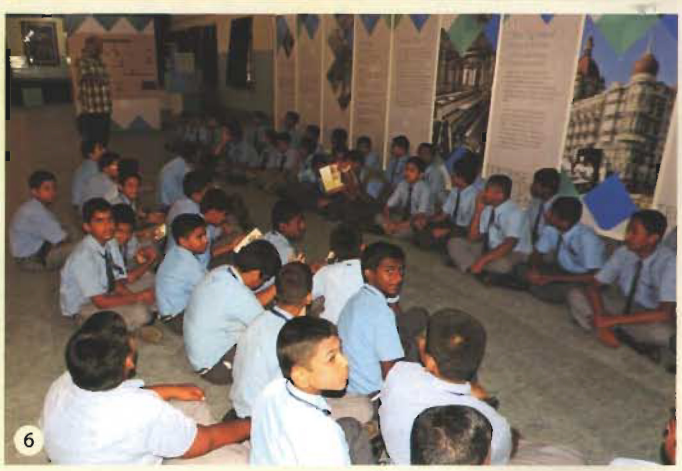
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COMMUNICATING THROUGH EXHIBITIONS...

1. *Boarders from Nursery to Class X, on a tour of the Exhibition.*
2. *Some of our youngest visitors.*
3. *The Family Tree being explained to students.*
4. *Students deeply engrossed in the tour.*
5. *Group tour in progress.*
6. *Students gearing up for the Quiz.*
7. *Quiz Session in Progress.*
8. *Quiz Winners from Class XI.*
9. *Students filling feedback forms.*
10. *Quiz Winners from Class VIII.*
11. *Quiz Winners from Class X.*
12. *Students going through the Panels.*


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COMMUNICATING THROUGH EXHIBITIONS...

In addition to the J. N. Petit Technical High School, 11 other schools from the city participated.

A total of 1,742 teachers and students visited the Exhibition at this venue.

It was well received and enjoyed by all.

Really innovative & information exhibition which will give different vision to the students. The founders of Indian Industries & other sections, with various details of TATA family will be a Light House for every one.

The exhibition was innovative and contained a lot of information. The students were very interested and answered the quiz well.
Well done! Keep it up! Very Nice -

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COMMUNICATING THROUGH EXHIBITIONS...


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The exhibition & documentary both were too good. Children really enjoyed it a lot. Every Indian should take inspiration from such eminent personality.

The following schools participated

1. *Bharati Vidyapeeth High School, Erandawane.*
2. *Anjuman-I-Islam APM English Medium School.*
3. *Sardar Dastur Nosherwan Girls' High School.*
4. *New India School.*
5. *Saraswati Vidyalaya Union High School & Junior College.*
6. *Sardar Dastur Hormazdiar High School.*
7. *Rasiklal M. Dhariwal English Medium School & Jr. College.*
8. *Vidya Pratishthan's New Bal Vikas Mandir, Baramati.*
9. *BVB's Paranjape Vidya Mandir Kothrud.*
10. *Sardar Dastur Hoshang Boys' School.*
11. *Stella Maries School.*


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COMMUNICATING THROUGH EXHIBITIONS...

Since the Exhibition received an overwhelming response, Tata Central Archives (TCA) was unable to accommodate all the students at the Petit School. For the benefit of school and college students who did not get an opportunity to view the Exhibition, it was reorganised at TCA.

These schools also had an opportunity to view J.R.D. Tata's Office which has been recreated at the Archives. Over 800 students viewed the Exhibition, including two Marathi medium schools.

TCA thanks all the principal, teachers and students for the enthusiastic response received both at the J.N. Petit Technical High School as well as at the Tata Central Archives.


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1. *Bishop's Junior College, Camp.*
2. *Anjuman-I-Islam APM English Medium School.*
3. *St. Joseph Boys' High School.*
4. *Bishop's School, Camp.*
5. *MES Boys High School.*
6. *Bopkhel PCMC, School No.101.*
7. *Pawar Public School.*

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