ISSN 0829-3686

BICHITRA SAMACHAR

Bichitra

বিচিত্রা

The Newsmagazine of
the Bengali People of Manitoba

Manitoba Youth
Moving Ahead
International
Youth Year 1985

VOLUME 1 DECEMBER, 1985 NUMBER 2

By Bengali artist Nandalal Bose

EDITORIAL

Nineteen eighty-five has been a very hectic year with our many cultural activities. This year, especially, was the most productive because, for the first time, the younger generation of the Bengali community have put together something that will last for a long time. They initiated the newsmagazine, Bichitra Samachar. The first issue came out in August, 1985.

The second issue deals mainly with life in Bengal during the British rule. Their ideas changed the Bengali way of thinking and played a major role in the evolution of Bengali culture and its political, social, and religious aspects.

The religion Islam is also discussed in this issue. It will help the Bengali-Canadian youths become aware of the well developed multi-religious Bengal.

Also, articles on three notable Bengalis have been included in this issue. They have not only affected the lives of Bengalis but have also influenced the world. One is a world-famous statistician, another a political leader, and the third is a world renowned musician. They have been chosen to give the readers an idea of the multi-faceted genius of the Bengalis. As in the previous issue, there is also a section on Canadian-Indo-Canadian relations as well as current developments in the field of science and technology in India. This broad coverage is intended to provide a better perspective on Bengali tradition and heritage.

As International Year of the Youth draws to a close, we hope that the contributions from the youth to this informative journal will continue. This project, although started in celebration of the youth, should be continued for many years to come. We hope that future issues will continue to present such factual articles of general interest. In this way, we will gain a better understanding about ourselves and in so doing, be better able to communicate with other cultures in Canada.

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Acknowledgments

Bichitra gratefully acknowledges the financial assistance provided by the Manitoba Intercultural Council and Dr. Upen Banik of Montreal for this issue of Bichitra Samachar.

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BENGAL OF THE PAST

Earliest composition of Bengali verse - CHARYA PADAS

The Charya-pada stand at the head of Bengali literature. They are in a way the prototypes or precursors of the later Bengali *Sahajiya* songs, the *Vaishnava-padas*, the *Sakta* hymns, the *Baul* songs, and even the "Marfati" songs of Moslem (Sufi) inspiration. Primarily religious, some of the Charyas breathe true poetry.

ভবনী গহন গম্ভীর বেগেঁ বহি
দুআন্তে চিখিলা - মাঝে ন থাহি।
ধামার্থে চাটিলা সঙ্কামুয়া গদাই
পারগামি লোয়া নিভর তরাই।
ফাড়িয়া মোহ-ভুক পাতি যোদাই
আদা দিঢাই তাঁহি নিবান কোহাই।
সঙ্খুমোয়া-ত চাদাইল দাহিন বামুয়া মাহারি:
নিয়াদি বোহি দুরি মা যাহি।
যাহি তুম হে, লোয়া হে, হৈবা পারগামি
পুছা তু চহিলা অনুত্তর - স্বামি।

চর্যা: লেখক ভৈতিলা: রাগ-গুঞ্জরী

English Translation:

"The Ocean of Being is deep, and it flows with mighty force:
On two sides, mire - in the middle, no bottom.
For the sake of Dharma, Chatila builds a bridge;
People who go across pass on in full reliance.
Splitting the tree of ignorance, he joins the planks:
With the strong Axe of Advaya (Monism) he strikes at Nirvana.
Do not turn right or left on mounting the bridge:
Bodhi (Supreme Wisdom) is so near - do not go far.
O ye men, if ye will be goers - across,
Ask of Chatila, the master without a peer.

Bengali Renaissance in the 19th Century

Sometimes we take for granted the freedom we have in how we live our lives, the career we choose, where we live and the freedom we have in expressing our ideas. Bengal and India have come a long way in the development of the sciences and in the economy. Some of the development ranks with the best in the world. But this has not always been so. During the Moslem reign or even before that, there was no apparent social or economic development in India. A Bengali statesman, Dwarakanath Tagore once wrote, " The present characteristic failings of natives are want of truth, a want of integrity, a want of independence. These were not the characteristics of former days, before the religion was corrupted and education had disappeared. It is to the Mahomedan conquest that these evils are owing and they are the invariable results of the loss of liberty and national degradation. The Mahomedans introduced in this country all the vices of an ignorant, intolerant, and licentious soldiery. The utter destruction of learning and science was an invariable part of their system, and the conquered, no longer able to protect their lives by arms and independence, fell into opposite extremes of abject submission, deceit and fraud. Such has been the condition of the Natives of Hindustan for centuries."

It was not until the conquest by the British that these thoughts were openly discussed. The British brought with them ideas of religious and social reform. These ideas awakened the sense of Indian nationality and patriotism. For the first time, literature in the form of prose and poetry were created and these ranked with the most developed in the world. Political ideas and organizations developed which finally led to the freedom of India. The nineteenth century was an era of Renaissance in India, mainly Bengal. In one century,

Bengal passed from the Medieval to the Modern Age, and served as an example for other provinces of India to follow.

This drastic change was mainly due to the English education and the ideas which flowed with it. Also, this change was due to the exceptionally adaptive and intellectually alert people of Bengal.

Many say that English education was forced on the Bengalis by the English to create clerks, but this was not so. The spread of the English education was largely due to the efforts of many public-spirited Bengalis, aided by the missionaries and some high-minded Englishmen.

One of the most important of these public-spirited and far-sighted Bengalis was Raja Ram Mohan Roy (1772-1833). His credit lies in that he tried to express openly in his own self all the qualities of head and heart, which are usually associated with western ideas imparted by English education in Bengal. He viewed religious and social ideas rationally without superstitions, prejudices, and conventions. Raja Ram Mohan appreciated the value and the cultural potentialities of English education, but at the same time he did not ignore the Bengali prose which he believed could be used as a tool for spreading these values. By raising the moral, material, and intellectual condition, he believed that the miseries of women and common men could be alleviated. He also wanted to raise their political status, and safeguard their civil liberties and economic interest by judicious reform in administration. These were traits that led to the progress in Bengal in the nineteenth century.

Records show that the first English school was established as early as 1800 at Bhawanipore, a suburb of Calcutta, and another in 1814 at Chinsura by its Magistrate, Mr. Forbes.

Large scale operation for the spread of English education did not occur until 1817. The Calcutta School Book Society and the Hindu College were both founded in 1817. The Calcutta School Book Society took charge of publishing English text books which were sold at very low prices. This ensured that everyone was able to purchase the necessary texts. Sometimes these text books were distributed free. The Society was managed by such eminent persons as Sir Edward Hyde East, J.H. Harrington, W.B. Bailey, William Carey, Tarinicharan Mitra, Radhakanta Dev, and Ramkamal Sen.

Before any of this could be put together, it took almost two years of preparations. In 1815, Raja Ram Mohan Roy had decided that he would open a school or Brahma Sabha for the purpose of teaching the doctrines of religion according to the Vedanta system. He was hoping that the superstitious notions and idolatrous practices of the Hindus would be removed.

An English friend who was with him at the time, disagreed with Raja Ram Mohan. Mr. David Hare (1775-1822), the European Secretary, suggested to him the idea of the college. Mr. Hare convinced Raja Ram Mohan that it would be far more enlightening for the people to learn the European literature and science instead of the Brahma Sabha. And thus the creation of the college had begun. With the request of Raja Ram Mohan, Mr. Hare prepared a proposal for the establishment of the college. Mr. Hare then asked Babu Baidyanath Mukherjee to collect subscriptions.

Finally, at the beginning of May, 1816, this proposal had reached Sir Hyde East. He was then the Chief Justice of the Supreme Court of Calcutta. The Brahmin, Babu Mukherjee, explained to him the desire of the leading Hindus to educate the children in the liberal mánner of the Europeans and told him that they wanted to hold a meeting for this purpose. With great enthusiasm, Sir Hyde East, after getting permission from the Governor-General and the Sup-

reme Council, called a meeting at his house on 14 May, 1816. More than fifty people of high rank and wealth attended this meeting, and nearly 50,000 Rupees were raised.

David Hare

At this meeting, they mainly discussed the cultivation of the Bengali and English languages. Besides this, as described by Sir Hyde East, they also discussed the Hindostanee language as convenient in the upper provinces, the Persian language, general duty to God, the English system of morals, grammar, writing (both in English and Bengali), history, geography, astronomy, mathematics, and in time, poetry.

Not only was this meeting significant in the fact that it helped in spreading English education; it was also significant for the fact that people of different castes were brought together for the first time. They had found at least one cause for which they could all work together. They had agreed on their children being educated together.

Many other English schools were established after the Hindu College in 1817. Raja Ram Mohan Roy, David Hare, and G. A. Turnbull each founded a school. More and more Hindus wanted the liberal manner of education and therefore more schools had to be established.

The Government had not yet extended the patronage to English education. In a journal named Sambad Sudhakar, an article was published on 7 September, 1833 stating that the Government spent 100,000 Rupees on the education of Sanskrit. This was of no use to the public since it only prescribed to Sastric rules. The Government seemed to give no heed to the fact that both Englishmen and Hindus together were financing and organizing English schools. The government was more inclined towards promoting oriental learning. Nevertheless, English education was quickly spreading through Bengal. By 1834, approximately 6,000 students were already studying English. In another periodical, dated 12 July, 1843, a list of a number of institutions in Calcutta was published. They were as follows:

Table 1.0 School Populations

Institution	Students
1. Hindu College	338
2. Schools under Calcutta School Society	300
3. Duff School	350
4. Church Missionary School	200
5. Oriental School	200
6. Hindu Free School	160

No tuition fees were paid by the students at the Hindu Free School and they were able to purchase their books at half price. Financing was first borne by private donations but later they appealed to public subscriptions.

Many schools were privately funded at that time. This encouraged more students to enroll and thereby increased the spread of English education. Even those who could not afford to pay the fees for books were able to attend the schools.

As students were zealous to learn, there were teachers just as enthusiastic to teach. One such teacher was Louis Henry Vivian Derozio (1809-1831). He was of Portuguese-Indian ancestry, his father having been an officer in an English mercantile firm. This young, gifted teacher moulded the lives of many students who had gone to the Hindu College.

Louis Derozio

In a book entitled "Life of David Hare" written by Pearychand Mitra, Derozio is described as a man who lived for truth. He impressed upon his students the importance of thinking for themselves, to live and die for truth. He taught them to cultivate all the virtues, shunning vice in every shape.

Under the influence of Derozio, the students drew their inspiration from Hume, Bacon, and Tom Paine. Derozio read to the students about the love of justice, patriotism, philanthropy, and self-abnegation.

Thus students of Hindu College held the most advanced radical views on political, social, and economic subjects. Some of them were deeply moved by patriotic fervor. Students held meetings and discussed how political, religious, and social views could be reformed. They formed associations and published periodicals expressing these views.

The first of their many associations were formed in 1820 with the help of Louis Derozio. It was named the Academic Association. At meetings of this association, they discussed "free will, free ordination, fate, faith, the sacredness of truth, the high duty of cultivating virtue, the meanness of vice, the nobility of patriotism, the attributes of God, and the arguments for and against the existence of the Deity as these have been set forth by Hume on the one side, and Reid, Dugald, Stewart, and Brown on the other, the hollowness of idolatry, and the shams of priesthood."

Another association formed in 1838 was called the Society for the Acquisition of General Knowledge. This Society mainly dealt with letting people know about the condition of the country. Then in 1840, the Hindu Theophilanthropic Society was formed by Dr. Duff.

The students also published several magazines during the period of 1828-1843. Some of these were: "Parthenon" (1830), the "Gyananneshun" (1831-1844), the "Hindu Pioneer", and the "Bengal Spectator" (1842). These magazines mainly dealt with the conditions of the country, science of politics, science of government, and the science of law.

With the knowledge gained from the English education, the Bengali people

and especially the students began to realize the importance of self-government. They wrote in their journals and magazines about how the Government of India under the English was purely aristocratical. With the guidance of Derozio, the students suddenly had a desire for liberty and became very patriotic. The students became aware of the most radical ideas through his teaching. They had a sudden interest in the revolutionary activities in France in 1830. The history and revolutionary philosophy of France was studied by them thoroughly. Derozio's students hoped that a similar revolution would occur in India. Kashiprasad Ghosh, a student of the Hindu College, had written several poems on patriotism. Though the students wanted a revolution, they knew this would not happen in their lifetime. This statement is clearly expressed in the following verse by Kashiprasad:

But woe me! I shall never live to behold,
That day of thy triumph, when firmly and bold,
Thou shalt mount on the wings of an eagle on high,
To the region of knowledge and blest liberty.

The students of the Hindu College held more advanced political ideas than Ram Mohan. They would in fact go against the Raja's points of view. Raja Ram Mohan wanted to form a permanent British colony in India but the students were against this. In a paper published in the "India Gazette" (12 February, 1830), the writer had traced the course of history of colonization and described the oppression and the adverse effects on the native population by the Greeks, Romans, and the Phoenicans of the ancient, and the English, Dutch, and Spanish colonies of the modern times. He wrote in a satirical manner on how the invaders had tried to improve the natives. "No sooner did the benevolent inhabitants of Europe behold the sad condition of the natives than they immediately got to work to ameliorate and improve it. They introduced among them rum, gin, brandy, and other comforts of life, and it is astonishing to read how soon the poor savages learnt to estimate these blessings." There was a gradual increase in the dissatisfaction of the Bengalis with the English Government. People like Rasikkrishna Mallik (1810-1858) and Dakshinaranjan Mukhopadhyaya were both against the Government. Mukhopadhyaya had expressed in his own opinion that the foreign rulers' only concern was for themselves. The foreigners had no desire to promote the philanthropic desire and the welfare of the native people. The poverty, he thought, was due to the foreigners.

The Hindu College had played a major role in helping create the creative mind, the high level of intellectual eminence, and understanding of the most advanced views known in all types of human activities found in any part of the world, and patriotism which was not a known sentiment until then. Many brilliant students had emerged from that college. They had all played a very dominant role in almost all branches of public life in Bengal.

As English education moved forward to all parts of Bengal, the Government still had not acknowledged this fact. In 1823, the Government set up the General Committee of Public Instruction for promoting education. The Committee was given a grant of 100,000 Rupees to spend accordingly. The Committee decided to follow the old established policy of promoting Sanskrit and Arabic learning. This was not very popular and all the money spent was wasted. The European method of learning was here to stay.

For nearly ten years there was a

constant battle between the Committee and the people who wanted English education. Raja Ram Mohan, in a letter written to Governor-General Lord Amherst in December, 1823, stresses that the Sanskrit system of education was the best way to keep the country in darkness. The weekly Bengali journal, Sumbad Sudhakar, had published the views among the Indians on English education. The people primarily wanted this form of education to "remove their darkness of ignorance", but they also looked upon English education as a tool to enable them to take part in the administration of the country and any other activities which would benefit the people. The people also wanted the use of English in the courts. The courts were still using Persian even when there were many Indians who already knew English. With the many reasons for English education, the Committee was not affected in any way. They continued to support the Sanskrit and Arabic system.

It was not until the arrival of Lord Bentinck that any changes had occurred within the Committee of Public Instruction. Lord Bentinck favored the views expressed by the people who wanted English education. In his letter to the Committee written on 6 June, 1829, he expressed the importance of improving India by spreading European knowledge, morals, and civilization to other cultures. He wrote that it would be best to conduct public business in English and that the British Government would not stop encouraging the execution of this project. The Committee was not able to agree to any plan. Some agreed on the continuation of Sanskrit and Arabic, and some agreed on English and the vernacular.

With the arrival of Macaulay in 1834, the question of which language was to be the medium of instruction was answered. Macaulay was appointed the President of the Committee, but he did not want to act as such until it was decided by the Governor-General the language of instruction. Many meetings were held to discuss this. Then in a letter dated 2 February, 1835, Macaulay stated that English would be best as the language of instruction.

Finally on 7 March, 1835, the Government of India ended the long and bitter controversy between the Orientalists and Anglicists. On this day, the Government decided to promote European literature and science among the natives of India and the medium of instruction to be used would be the English language. It was also decided that the Education Fund should be used only for English education.

With this policy, English education advanced further into the Bengali culture. The people had no liking for the vernacular schools and therefore these did not flourish even with the Government's efforts to maintain them.

The Government was now gradually controlling the Hindu College. The students were not happy with this. In 1843, Matilal Seal, a millionaire of Calcutta, established a new college. This college provided free education to 500 students.

More and more people looked upon education mainly as a passport to higher appointments, and thus schools began to teach "English literature in all branches, history, geography, elocution, writing, arithmetic, algebra, geometry, higher branches of mathematics, the physical sciences, and the practical applications of mathematics.

A crisis had developed in the Hindu College which finally split the college apart. At this time, the Hindu College was completely under the control of the Committee. This Committee had allowed the son of a prostitute to attend the college against the wishes of the College Council and the public. Therefore, on 2 May, 1853, Rajendranath Datta, a rich citizen of Calcutta, established the Hindu Metropolitan College. The difference between the

Committee and the College Council remained even after the Hindu College had expelled the son of the prostitute. Then on 13 May, 1854, the Government split the College and formed two institutions. The Presidency College was open to all caste and creed and the Hindu School was open only to Hindus.

The English education was becoming not just a way of enhancing and introducing new ideas but it was becoming useful in obtaining material benefits. Lord Hardinge, the Governor-General (1844-1848), made English as the only means by which one could gain higher appointments when available to Indians. This policy made English education even more popular among the Indians. English education had gradually emphasized its material and economic value in place of the liberal and cultural value.

One of the drawbacks with the introduction of English education was that it had an opposite effect on the Moslems. At first they did not get involved with this movement. Early record showed that there was not a single Moslem name among the names of brilliant students. There were very few Moslems who had received an English education. The only reason that the Moslems did not want the English education was that they believed that the government wanted them to become Christians. A petition was signed by 8,000 Mohammedans of Calcutta to protect against the policies made by the Government in 1835.

Figures from the Education Reports published in the "Amrita Bazar Patrika" (12 August, 1869) showed that in 1865, nine Hindus and no Mohammedan passed the M.A. Examination, 41 Hindus and 1 Mohammedan passed the B.A., and 17 Hindus passed the Law Examination. All the Medical graduates were Hindus.

Slowly, the leaders of the Mohammedans began to realize the importance of the English education. A meeting was held on 30 January, 1868 by Abdul Latif, founder of the Mohammedan Literary Society, who urgently stressed the necessity of an English education of Mohammedan boys. He also suggested that the Anglo-Persian Department of the Calcutta Madrassa be raised to the status of a College.

Moslem education in Bengal gained momentum with the help of Haji Mohammed Mohsin. He had left a large legacy and the Government decided that two-thirds of the fees in any English school or college would be paid to every Mohammedan student, out of the Mohsin Trust Fund. Because of this, there was a large surge of Moslems in Bengal studying in English as compared with the other provinces. The following figures show that this was true:

"In 1881-82 the number of Mussalman students pursuing their studies in Colleges in the Bengal Presidency was 106 as against 30 in Madras, 7 in Bombay, 29 in the N.N. Provinces, 7 in Oudh, and 13 in the Punjab. In the High Schools of Bengal there were 3,831 Mussalman students, as against 117 in Madras, 118 in Bombay, 697 (including students in Middle Schools) in the N.W. Provinces, and 91 in Punjab. Between 1858 and 1893, the Calcutta University produced 290 Mohammedan graduates, as against 29 of the Madras, 30 of the Bombay, 102 of the Punjab, and 102 of the Allahabad University."

With the advent of the English education in Bengal, the people had finally found a way to express their feelings openly. They had been given the chance to undo all the negative attributes brought on by previous invaders. If people like Raja Ram Mohan Roy, David Hare, Louis Derozio and many others not mentioned had not initiated the political, social, and religious

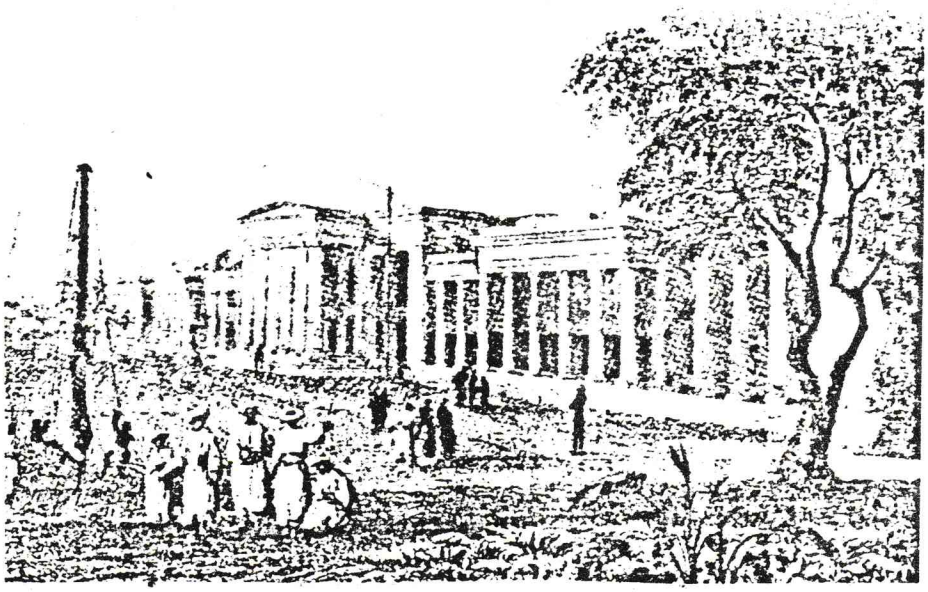
reforms, Bengal and India would perhaps still be living in the 'Dark Ages'.

A sense of patriotism and Indian nationality was formed. This was not as strong as before the arrival of the British. The Hindu College gave the stu- dents a spirit of true national feeling, a sense of acute judgment, the power of expression, and the depth of learning. These students left behind knowledge that the future students used in their campaign against the British. The Hindu College did not denationalize or Anglicize the Hindus of Bengal as was generally supposed. The education only strengthened and enabled them to feel their own power. Perhaps it was because of education that the British did not reign in India as long as the Moslems.

Bengal became the leader in liter- ature, sciences and the fine arts, in all of India. Bengal raised men like Rabindra Nath Tagore. He wrote plays, poetry, composed songs; his abilities were limitless, and he did them in English as well as in Bengali.

Supposing that the British had not come to India, the development of India would perhaps have been much slower. Perhaps India would still be under the reign of the Moslems. There would per- haps not be such developments in the sciences and technology that is now present in Bengal and India.

Shibani Bal



The Hindu College

Calcutta during the British Raj

"The many sided, the smokey, the magnificent city of Dreadful Night", Rudyard Kipling's description of Calcutta suits the great city, especially, during the time of British rule in India. In 1698, Job Charnock acquired from the Moghul Emperor the three neighboring villages of 'Sutanati', 'Govindapur' and 'Kalikata'. The area was fever-affected and malaria-ridden, and was almost unfit for human habitation. On this site Chernock built Fort William, christened under the name of England's king, and out of it grew Calcutta city. She became the modern Babylon rivaled only by London and few cities in the world could match her extremes in wealth and poverty. As capital of an empire and home to princely palaces and corrupt businessman, it was here that a new unification of Anglo-Indian culture and attitude emerged, and the British Raj became firmly established.

In 1912, when the capital of British India was transferred to Delhi, Calcutta city had a population of 3,162,587 and was divided into three municipalities. These were: Calcutta proper which included the port, canals, and Fort William; the suburban municipality was made of Cossipur-Chitpur, Maniktala and Garden Reach; and finally Greater Calcutta which included the city of Howrah. Howrah was essentially the residential area of those who worked in Calcutta proper; its industrial life, however, was much like that of the metropolis's center. Calcutta proper, encompassed an area of 32 square miles, of which the Fort, port, and Maidan took up 11 and 2 square miles respectively. The docks at Kidderpore, which opened in 1882 were over a square mile in area and were connected to the railway system on the east and the Hoogly by a steam ferry which traveled to and from Shalimar.

The original Howrah Bridge, opened in 1874, was a pontoon bridge with a moveable middle section for the passage of boats moving up and down the river. Later, this was replaced by a hanging bridge. The municipalities seemed to blend into one-another structurally which made it hard to distinguish one municipality from another. The Hoogly River, however, separated Howrah from Calcutta proper; the river also provided for the city's water supply which was drawn from the principal channel mains.

During the British rule in India, Calcutta's beauty lay within her diversity. The city's natural beauty was provided for by the Hoogly River and the Maidan. The river was broad and deep enough to act as a highway for ocean commerce. The Maidan, situated between the river and the city, was a beautiful park-like open area admired by all. Included within Calcutta's natural beauty were the various stately gardens. The Zoological Gardens at Alipore were opened by the Prince of Wales in 1876. The Eden Gardens near the Government House were named after the sisters of Governor General Auckland. The Botanical Gardens at Shibpore, which were opened in 1787, would, according to the Bishop Heber, be a "perfect answer to Milton's idea of Paradise if they were on a hill instead of a dead flat."

Many of Calcutta's statues and monuments stood in the Maidan. The most outstanding of these was the Ochterlony Monument. Erected to the memory of Sir David Ochterlony, the General responsible for the victorious conclusion of the Nepal War in 1815, it was a pillar topped by a 'pepper-box' like structure of about 165 feet height. There were other statues of soldiers and sailors, notable among them was one of Sir

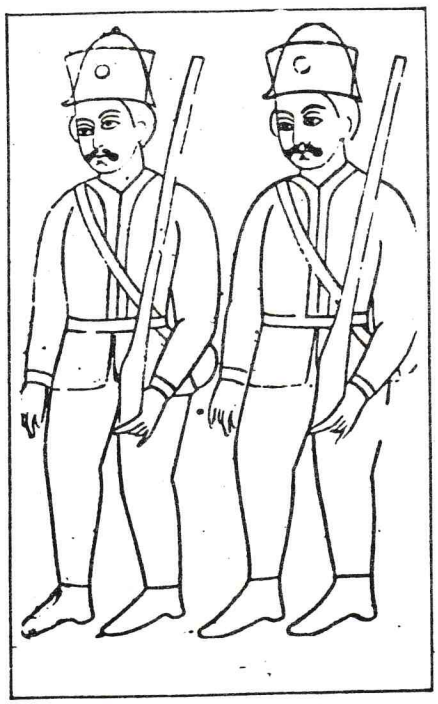
William Peel, leader of the Naval Brigade during the Sepoy Mutiny. The most conspicuous statue, however, was an equestrian detail of Sir James Outram sculpted by Foley.

The 'noble' side of Calcutta was lined with beautiful streets full of stately houses. The principal residential quarters of the city's Europeans and wealthy Indians were within the boundaries of Park Street, named after Sir Elijah Impey's park-like gardens, and the Lower Circular Road. Running parallel to the Hoogly River and alongside the Maidan was Chouringhee, a noble thoroughfare which was the original "Village of Palaces". Other fine streets were named after great British personalities such as, Clive Street, Cornwallis Street, and Wellington Street.

The buildings of Calcutta were architecturally beautiful as well as magnificent. In 1803, Calcutta's most conspicuous building was the Government House. Built in reply to Marquis Wellesly's proposition that "India should be governed from a palace, not from a counting house", it became the residence of the Governor General of India for over a century. The building itself was designed after the Kedleston Hall of Derbyshire, the ancestral home of Lord Curzon, Governor General from 1899-1905. The House consisted of a great central area from which radiated four detached wings, each the size of a large house. Constructed entirely of brick covered with white plaster, the total cost of the building was £ 3,750. In 1829, a dome was put up with an additional cost of £ 3,750. On the north side of the Government House was a huge iron gun, laid upon a winged dragon with red eyes. The gun was placed to commemorate the peace achieved between the Naval and Military Forces of England and India in 1842. Two other cannons commemorating the victory in the Afghan War and the annexation of Sind were found in the Government House grounds. To the south side, was the famous Lal Dighi, or Red Tank, in Dalhousie Square. Lord Curzon added an exquisite garden in the southern area of the House.

The Victoria Memorial House was without a doubt, as beautiful as the Government House was magnificent. It was built to commemorate the Golden Jubilee of Queen Victoria's reign, a year after her death in 1901. Constructed in the Italian Renaissance style, it took 20 years to complete the majestic 160-feet marble structure. It was placed on a marble platform between two symmetrical basins of water, where it was surrounded by lush gardens and could be seen from the four corners of the Maidan.

Historically, the most important building was the old Fort William. It was situated to the west side of Dal-



housie Square and east of the Hoogly River. In the middle of the Fort was the Governor General's residence, known as the Factory. The Factory was two storeys high and more than likely to have been used as office space. In 1757, the Fort was seized by Siraj-u-daullah, the Nawab of Bengal.

The High Court of Calcutta, built in 1872, was an impressive building designed after the Town Hall of Ypres in Belgium. Other notable buildings were: the Indian Museum founded in 1814, the Calcutta Town Hall built in 1804, and the Imperial Library, which was formally Metcalfe Hall. The Writers' Building was in Dalhousie Square. Here once, the East India Company clerks kept their books balanced. In front of the building was a monument commemorating those who died in the Black Hole of Calcutta. Other impressive structures were those of educational institutes and hospitals. The finest and oldest of Calcutta's many hospitals was the Presidency General hospital, which was originally a military hospital for European soldiers and Indian Sepoys. Later, the hospital was used for service to the general public. Calcutta's young elite was provided with English education and Western learning by many colleges. The largest and most prestigious of them was the Presidency College. The Hindu College was founded in 1816. The first Civil Engineering College was established in Shibpore; its Gothic structure and turrets resembled those at the Oxford and Cambridge campuses. Notable missionary colleges were the Scottish Church and St. Xaviers. In addition, there were the religious establishments of Calcutta. In 1847, Calcutta Cathedral was built primarily out of the efforts of Bishop Wilson. In 1897 the 20-foot spire of the cathedral was rebuilt after it was severely damaged by an earthquake in the same year. The Cathedral replaced the old St. John's Church of 1784. The most beloved and sacred site of Hindu Bengalis was the shrine of the Goddess Kali at Kalighat. It was found on Tolly's Nullah, an old channel of the Ganges which was canalized by Colonel Tolly in 1776.

Calcutta had a dark side too. Apart from her magnificent streets and buildings, there were also slums and derelict residences. This was due mostly to the British rule's neglect of India's less fortunate. The sanitary conditions in many areas of the city were deplorable. A Sanitary Survey of Calcutta made in 1896 reported that "water, urine and liquid sewage was simply splashing on the ground, fouling the whole gali or lane and soaking the walls of the house, which, in many cases, were thickly covered with filth ... for which there is no escape." By the end of the nineteenth century, Calcutta became known as the "world headquarters of cholera", when it was virtually eradicated in Europe. Many parts of Calcutta contained a pattern of "mean" streets, which were improved upon by a substantial Improvement Trust in 1916. By 1916 as well, the city had been "purified and rendered sanitary and as healthful as any place in Bengal", according to author L.S. O'Malley.

During the years of British rule in India, Calcutta remained the economic, philosophical, political, and artistic hub of Indian life; the city was also the center of India's social elite. Many of India's elite, the lawyers, teachers, journalists, and authors who were known as the intellectual "bhadrolok" or gentlemen, made Calcutta either their place of residence or practice. They studied English and memorized more of Milton, Chaucer, and Shakespeare than did most of their British peers. Many nationalistic groups and institutions flourished and were housed in Calcutta by the patronage of this select corps of elite.

In 1784, William Jones, a judge of the Calcutta High Court founded the Bengal Asiatic Society. Jones was the first great British scholar in India to read and write Sanskrit with ease. The Society published his essays on Indian music, chronology, religion, botany, and zoo- logy.

The story of Calcutta would not be complete without mentioning some of her illustrious sons.

Raja Ram Mohan Roy, one of Hindu renaissance's major figures founded in Calcutta, the 'Brahma Samaj', the center of a 'new religion' incorporating Christian principles and ancient Hinduism in 1828. A scholar of world reputation, Roy spoke out against "Sati" - an orthodox Hindu practice of burning a widow along with her deceased husband in his funeral pyre. Roy influenced Lord William Bentinck, the Governor General of Calcutta from 1828 to 1835, to abolish this inhuman social practice. In 1829, 'The Act of Abolition of Sati' was passed in Calcutta for the "good of mankind", as Lord Bentinck's minute aptly put it. Bentinck was also credited as initiating the era of "utilitarian liberalism" in Calcutta.

Probably one of India's most begrudged natives by the British was Calcutta's Surendra Nath Banerjee. He was the first Indian to qualify in the Indian Civil Service Examination, scoring higher than did most of his British competitors in London in 1869. The British bureaucracy, however, disqualified him twice from the service. Once, the reason was for "lying", as Banerjee had, like most Indians, included the first nine months of life within the womb as part of his age. In 1876, he founded the Indian Organization, the first nationalist, political organization, in Calcutta. Banerjee played a major role against the partition of Bengal by Lord Curzon in 1905, as he led the protesting forces with his slogan, "Surrender not". The Calcutta newspaper, "The Bengalee", was published by Banerjee and competed against the well-established weekly newspaper, the "Amrita Bazar Patrika", edited and published by Motilal and Shishir Ghosh.

Aurobindo Ghosh, one of Calcutta's well-known nationalistic figures, became the "high priest" of the national literary spirit during the aftermath of Bengal's partition in 1905. As a protest against British operations in Bengal, he became a terrorist and later took exile in the French enclave of Pondicherry in 1910 where in later years he became a saintly and spiritual man, known to the world as "Sri Aurobindo". Quite different from Ghosh in accomplishment and nature, but almost as noteworthy was the prince Dwarakanath Tagore, grandfather of poet Rabindra Nath Tagore. He became the first Indian bank director and in 1929, he founded the Union Bank of Calcutta.

While under the British rule, Calcutta became the foremost center of bureaucratic, economic, and educational activity in India. Through 1885 to 1905 especially, 'the Crown' secured her grip upon Calcutta, the capital of British India. Her Supreme Court and Bar had pre-eminence over all others. The shipping which occurred in the Hoogly River, the commonplace docks and jetties and the many bank offices used by the "merchant princes" were all familiar representations of Calcutta's industrial and commercial life. The city and the area around it were the axis of the prosperous jute industry, whereas the docks at Kidderpore handled most import and export in and out of Calcutta. Educationally, by 1850, Calcutta had 11 affiliated colleges and Bengal became linguistically more homogeneous than any other area of India.

The colleges and their professors, such as the Portuguese-Indian poet, Henry Louis Derozio, inspired Bengali youth to seek universal learning and creative expression.

The very nature of British rule in India made Calcutta's citizens seek education and work toward a better life. The rule spurred on an increase in growth and prosperity of Calcutta.

Nearing the end of the British rule, Calcutta had emerged from Job Chernock's three uninhabitable villages to become one of India's most attractive and vibrant cities. Furthermore, her native citizens had contributed to the amelioration of Calcutta, Bengal, as well as the rest of India.

Ratna Das

MODERN BENGAL - RELIGION & GREAT MEN

Essence of Islam

What is Islam? "Islam is a religion" one might say but actually that is far too vague a description for such a vast and all encompassing concept. Islam is not just a religion but a sophisticated way of life guided by God. Some may find this hard to believe, but it is true.

Islam is the act of submitting one's will to the Will of God. It includes five main elements: (1) Belief in one God, master and creator of all things and belief that Mohammed (peace be upon him) is the messenger of God. (2) Prayer five times a day. (3) Fasting during the lunar month of Ramadhan. (4) Giving of money or supplies to the needy. (5) Pilgrimage to the Kabah Sharif or the House of God in Mecca (obligatory only for those who can afford the expenses).

Why do Muslims practice these five essentials? What is their purpose? The answer is quite simple if one looks into his or her own self. A person is made up of three dimensions: the body, the mind, and the soul. Often the soul of a person, which has spiritual needs, is neglected because of the supposed "more important things in life", such as excessive material possessions, money, work, position, pride, and superficial relationships, all of which serve the body and mind. Thus, in neglecting the needs of the soul, man has become two-dimensional in nature and in effect, a superficial person. A Muslim, however, seeks a balance among body, mind, and soul to attain a three-dimensional state. One's belief in God comes from one's God-given soul. It is from faith or need of God that a Muslim follows and obeys the path of Islam, or obedience to God.

The Literature of Islam

The Islamic path guides a Muslim (one who submits one's will to the Will of God) to be the best one can be. The two sources of literature a Muslim follows are the Holy Quran, and the example of the Prophet (p.b.u.h.) compiled in the books called Hadith or Sunnah of the Prophet (p.b.u.h.).

The Quran is a book full of wisdom and knowledge to guide decision-making, to solve problems and to teach correct behavior and morals. Many historical events of prophets (peace be upon them all) and peoples are told in the Quran as well, which serve as lessons to learn from. Each chapter in the Quran is unique and has its own rhythm and rhyme. It has not been changed or distorted and has remained in its purest form since it was revealed fourteen centuries ago. This book contains God's exact words to mankind - not man's word to man.

The Sunnah or Hadith of the Prophet (p.b.u.h.), another source of guidance for Muslims, is made up of many books. It contains the examples of correct behavior and conduct of all human beings, practiced by the Prophet (p.b.u.h.). This is guidance from God too but through the holy Prophet (p.b.u.h.).

Together, the Quran and the example of the Prophet (p.b.u.h.) teach Muslims to take care of their body, mind, and soul.

The Guidelines a Muslim Lives By

In order to take care of their body and appearance, Muslims must keep

themselves clean, decently dressed, physically fit, and they must practice good etiquette. "Cleanliness is half the faith", as the holy Prophet (p.b.u.h.) used to say. Following his example and the guidelines of the Quran, Muslims bathe frequently, clean well after going to the washroom, and wash-up before each prayer. Also, a Muslim is guided to dress tidily and decently. There is a code of dress for men and women in which women must cover themselves from head to foot excluding hands, feet, and face while men must be covered down to their knees at least. Men can wear short sleeves but shorts are not allowed for either sex. This is important since Muslims are not allowed to have premarital relationships. Modesty and purity are very important to both Muslim men and women and must be guarded accordingly.

In the Quran, the emphasis on not consuming the following foods explains the importance of physical health for Muslims: 1) blood (can carry germs, viruses, and fats from animals unclean for the human body) 2) alcohol (disrupts the body's chemical functions) 3) flesh of a pig (a pig is a scavenger and therefore its flesh is unhealthful). Also, the fasting held in Ramadhan according to the Quran, not only purifies a Muslim's mind and soul but helps clear the fatty deposits in the arterial walls of one's body. This helps prevent heart diseases and other related diseases. Besides eating right, exercise is also encouraged. Moreover, a Muslim is guided to practice all-round etiquette. Etiquette basically includes correct behavior at the table, and is practiced by Muslims as it was by the Prophet (p.b.u.h.). A few of these manners include the following: Before eating, a Muslim starts by saying "Bismillah" or "In the name of God". Then one eats and drinks using the right hand, and eats the food nearest on the plate to him or her and drinks politely without making noise, breathing out in the drink or gulping it down in one breath. Thus, through the observation of these guidelines, Muslims take care of their body and appearance. "A healthy body makes a healthy mind", yet, a Muslim should also possess a good character, and be able to control anger and seek knowledge according to the Holy Quran and Sunnah. It is very important that a Muslim is kind, helpful, generous, considerate, polite, grateful, and soft spoken with others. Also a Muslim has the duty to respect parents, elders, other people's privacy and feelings and other people's religion and culture. One should take on a sense of humility and realize that everyone is equal under almighty God (this is where almsgiving comes in). Relations between children and parents, husband and wife, brothers and sisters and friends and neighbors should all hold understanding, kindness, and respect. Honoring parents is very important for a Muslim. In the Quran it is said that a child should not even say "fie" (or any expression of disgust) to their parents. Conversely, parents should love and teach their children good and respect their children's feelings. Muslims also must respect the feelings of others, therefore backbiting is forbidden. The Prophet (p.b.u.h.) said that backbiting was worse than adultery. Similarly, hypocrisy and frivolous talking are also despised. Muslims must do good and encourage others to do good as well. The most outstanding aspect of a Muslim's character, however, should be truthfulness. The Prophet (p.b.u.h.) was extremely truthful and was known as "Al Sadig, Al Ameen" or "He who is truthful and trustworthy" before his prophethood. Therefore it is of utmost importance for Muslims to be truthful and keep covenants and promises. A Muslim is also never to worship any deity except God because he is One and has no partners. These deities include wealth,

power, position, or other man-made gods. In this way one is truthful to oneself. Furthermore, in the Quran, Muslims are told to control anger and to be patient. This not only eases human relations but reduces a person's stress. Finally, it is obligatory for a Muslim to seek knowledge throughout life and thus enrich one's mind to the fullest.

A healthy mind and body can both serve the soul. Too much emphasis on them, however, can result in the neglect of the soul. This situation is quite tragic, so it is necessary to first define the soul. It is man's link with his Creator; it is his lifeline. But man's illusion of independence blinds him to this fact. He thinks he does not need God. In fact, no one is independent. When man is first created from nothing, he is given an umbilical cord which is his lifeline. When he is born, this physical umbilical cord is cut but an invisible one is then created between the parents and the child. As time goes on, the child becomes "independent" of his or her parents. Perhaps material security is set but security of soul or mental security is not. This security comes with friends and family or else material things are substituted. When they die or simply do not exist, man is alone - man is nothing. These are the temporary, God-given securities that give man an illusion of independence while throughout his life, man neglects the true need of his soul which is God. It is this need that a Muslim balances with the needs of mind and body. One does this by following Islam and especially by performing daily prayers which keep God's guidance continuous and improve the soul.

Sects Within Islam

Most adherents of Islam in today's world are divided into different sects: the Sunni, Shia, Ismali, and Quadi
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Jennifer R

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Sects Within Islam

Most adherents of Islam in today's world are divided into different sects: the Sunni, Shia, Ismali, and Quadiani. There is some confusion among the non-Moslems about the differences between these four sects. After prophet Mohammed (p.b.u.h.) died, Hazarat Abu Bakr was appointed as the first Caliph - the supreme leader of the Muslims. The next Caliph was Hazarat Omar, the third was Hazarat Uthman, and the fourth and last Caliph was Hazarat Ali. The main difference between the Sunni and Shia sects is that the former believes in this systematic hierarchical order. The latter, the Shia sect, believes that Hazarat Ali, the son-in-law of prophet Mohammed (p.b.u.h.) was the first Caliph and the other Caliphs followed after him. Another difference between the two sects is that the Shias, unlike the Sunnis, celebrate Muharram (the first Arabic month) by organizing processions and fairs to commemorate the death of Iman Hassan and Hussain, grandsons of prophet Mohammed (p.b.u.h.).

The third sect, Ismalis, are the followers of Agra Khan, whom they believe to be the direct descendant of prophet Mohammed (p.b.u.h.). All these sects have a belief that prophet Mohammed (p.b.u.h.) is the last prophet and the holy Quran is the last scripture from God through the angel Gabriel.

The fourth sect, Quadiani, who in addition to accepting the essence of Islam, also believe that after Mohammed (p.b.u.h.), there was another prophet called Ahmed Quadiani who lived in nineteenth century India.

Thus, Islam offers great wisdom and guidance to those Muslims who desire to become one with God. Life becomes an everlasting effort to improve in body, mind and soul under God's guidance.

Jennifer Rahman

Subhas Chandra Bose

Subhas Chandra Bose was born on January 23, 1887 at Cuttack in Orissa - a province of northeastern India. His mother was Prabhabati; his father was Janaki Nath Bose, a prominent lawyer of Cuttack. As one of eight children, Subhas was raised with all the love, affection, and care typical of a Bengali middle class family of that time.

At the age of five, Subhas was admitted to the Baptist Missionary School at Cuttack. His elder brothers also went to the same school, where instructions were given in English. When Subhas was 12 years old, Bengali became a compulsory language for all Bengalis at the matriculation level. He was then transferred to Ravenshane Collegiate School, where the medium of instruction was entirely in Bengali. Here, for the first time, he learned Bengali, and instead of wearing a European school uniform, he started going to school dressed like other Bengali boys in his class.

The headmaster of this school, Beni Madhav Das, was a true nationalist, and he tried to instill among his students a love for their country. While a student of Ravenshane Collegiate, Subhas organized many activities in support of other patriots and his less fortunate countrymen.

At the age of 15, Subhas was inspired by reading the works of Swami Vivekananda - a great religious leader of India at the time - who taught salvation through service, service to humanity and particularly to Mother India. He read all he could of Vivekananda and Vivekananda's master, the saintly ascetic Ramakrishna Paramahansa, that eventually led to his adoption of selfless service as his ideal. Subhas felt that he needed a spiritual guide and guru, and visited many centers of pilgrimmage in search of one. However, he could find no one of his liking.

He then started his college life in 1913 and began to study philosophy at the Presidency College in Calcutta, but got in trouble with the English professors, who made anti-Indian comments. As a result of this he was expelled from his College, but with the help of Sri Ashutosh Mukherjee, was admitted to another college, the Scottish Church College in Calcutta.

At that time he joined the University Training Corps, and his experiences there proved very useful in his later life. He was promoted to the position of non-commissioned officer in the Corps.

Subhas graduated from the University of Calcutta at 22 and went to England to appear at the Indian Civil Service Examination. He did very well and came out fourth amongst all candidates, but he resigned from the service. He decided to come back to India to work for the liberation of his country from British rule.

After landing at Bombay he met Mahatma Gandhi, one of the greatest leaders of India. At Gandhiji's suggestion, Subhas came to Calcutta to work with Deshabandhu Chittaranjan Das, the uncrowned king of Bengal. Soon Subhas became the right hand man of Deshabandhu, and for a living, he took on the principalship of the National College at Calcutta.

In 1921, Subhas was arrested for the first time, for anti-government activities, in his struggle for the freedom of India. When Deshabandhu formed his "Swaraj Party" to work with the Congress Party, Subhas joined this new party. In 1924, this party gained almost all the seats in the Calcutta Corporation elections, and Deshabandhu was elected the mayor and Subhas was appointed the Chief Executive Officer of the Corporation.

Under the guidance of Deshabandhu,

Subhas formed a volunteer corps to do social and political work. This volunteer corps was declared illegal, and following the murder of a European, Subhas was arrested on the false pretext of masterminding the murder. In spite of his denial of involvement in the murder, Subhas was punished without a trial and sent to the Mandalay jail in Burma.

Under the unhealthy and inhuman conditions found in the jail, Subhas soon fell ill and contracted tuberculosis. When people learnt about this, there was a mass demonstration demanding his immediate release. Finally, the government was compelled to release him and Subhas was returned to India, where he then spent some time at Dalhousie, in the Himalayas, to regain his health.

In 1928, during a session of the Indian National Congress in Calcutta, Subhas organized another volunteer corps and became its General Officer Commanding. The government became suspicious of Subhas and his volunteers, and jailed him again. In 1931, while in jail, he was elected the Mayor of the Calcutta Corporation and was thus released to take up his duties as the Mayor of Calcutta.

During this time, he planned public meetings in support of India's Independence Day, January 26. Since all the meetings and processions were banned, Subhas was jailed again, at Insin jail, near Rangoon in Burma. Once again, he fell ill and once again under public pressure, the government released him from jail.

Subhas then proceeded to Vienna for treatment. After his health improved, he toured many countries in Europe, promoting the cause of Indian freedom. He then returned briefly to Calcutta to see his dying father, but his father died before Subhas could see him. He returned to Europe, but after being elected the President of the Indian National Congress in 1938, he was allowed to come back to India.

World War II was now imminent in Europe and Subhas wanted to strike at the British to make India free. But other leaders, including Gandhiji, did not agree. In 1939, Subhas was reelected President of the Indian National Congress, but to avoid any split in the party, he formed a "Forward Bloc" within the Congress Party. Then, when he started to campaign for the immediate freedom of India again, he was sent to jail once more.

During his stay in jail, he became convinced that only an armed struggle could free India. To achieve his objectives, he planned to leave India to seek foreign help. In accordance with his plan, he started growing a beard and one day, escaped from jail, got onto a train and identified himself as Moulavi Jiauddin, an insurance agent. Upon arrival at Peshawar he played the part of a deaf and dumb Pathan, and travelled to Kabul in a loaded truck. Finally, he reached Berlin via Moscow and engaged himself in a hectic series of activities to liberate India.

During his stay there, he met Hitler and sought his help. But since Germany was too far off to wage war against the British in India, he decided to seek help from Japan. He travelled via a German submarine, transferred to a Japanese submarine, and finally reached Tokyo. From there, he went to Singapore, where he was received by Rash Behari Bose, another Indian revolutionary.

In Singapore, Subhas raised an army of Indian prisoners of war captured by the Japanese; he also formed the Rani of Jhansi regiment with Indian girls. He announced the formation of the Azad Hind Government on October 21, 1943 and appealed to his soldiers by saying: "You were fighting for an alien power. Now, you shall fight for your own country." He mentioned that India was a country of many religions with different ways of salutation, but with

the Azad Hind Government, the salutation would be "Jai Hind".

Subhas led an inspired army towards India and on the way, received generous donations from the Indian residents as a token of their fantastic support for the cause of the motherland's freedom. In March 1944, Imphal in northeastern India was completely surrounded by the Indian National Army (INA) and the Japanese. The INA entered Kohima on March 18, 1944 and raised the Indian national flag there.

However, the British resistance in Imphal was strong and the Japanese could not maintain the supply of arms and food any longer. Eventually, the Japanese surrendered to the British-American forces and the INA also surrendered on August 16, 1945. Netaji's (Subhas') life was now in danger as the British forces were searching for him. His soldiers asked him to leave and seek refuge in a safer place. Netaji, however, did not give up so easily. At first he refused to leave, but finally, he boarded a Japanese plane for some unknown destination, accompanied by Col. Habibur Rahman of the INA. After that, there was no further trace of Netaji. What happened to him on that fateful trip is still a mystery; he disappeared completely. Is he dead or is he still alive? Nobody knows the answer.

Even today, his fellow countrymen remember him at least once a year - on January 23, his birthday. He is remembered as one of the most fearless freedom fighters of the Indian subcontinent. He will long be loved and respected for the leadership which led his people beyond the confines of language, religion, caste and all other limitations, and inspired them to fight for the freedom of the motherland.

Asim Kumar Roy

Prasanta Mahalanobis - A Great Statistician

Professor Prasanta Chandra Mahalanobis was one of the world's great statisticians. Born on 29 June, 1893 in the city of Calcutta in Bengal, India, Mahalanobis was educated at the Calcutta University where he obtained his B.Sc. Honors degree in Physics in 1913. He was awarded a Senior Scholarship to study natural sciences and mathematics at King's College of the Cambridge University, England in 1915. He showed evidence of an analytical mind at a very early age - discussing and arguing on various subjects with his fellow students and superiors. As the years progressed, he grew to be both a rebel as well as an important scholar and contributor to the relatively young science of statistics.

Professor Mahalanobis held many positions in diverse areas both in academic and public life. He was a professor of Physics, Presidency College, Calcutta during 1915-45 and was the principal of the college from 1945-48. He was also a meteorologist in Calcutta during 1922-26.

To the world, however, Mahalanobis is known as an outstanding and highly imaginative statistician, and the founder of the Indian Statistical Institute. In statistics he served in several roles: as researcher, educator, and advisor to governments and international organizations. He became Director and Secretary, Indian Statistical Institute (ISI) in 1931 and Statistical Advisor to the Cabinet, Government of India in 1949 and held these positions until his death, 29 June 1972. He represented India on the United Nations Statistical Commission and became the Chairman of the U.N. Sampling Sub-Commission during 1947-51.

Many national and international scientific organizations honored Prof. Mahalanobis. He was nominated a Fellow of the Royal Society of London in 1945, Econometric Society in 1949. He held honorary executive positions in learned societies such as: International Statistical Institute, Vice-President 1936 International Biometric Society, Vice-President, 1947; National Institute of Sciences of India, Secretary General, 1945-48; Indian Science Congress, President, 1950. His research on anthropometric studies which led to the discovery of D^2 statistics is known throughout the world as the Mahalanobis Distance. He received many medals and awards, including the Weldon medal and prize by Oxford University, England in 1944.

The Bengal flood of 1922 brought Mahalanobis to the service of the Government of Bengal, something he had done many times before. To prevent further floods, a government commissioned board of engineers was about to recommend the construction of large retention basins for the water when the problem was referred to Mahalanobis. Through statistical methods he found that in fact poor drainage was the problem, and that the government should work on improving it. This they did, thereby saving countless rupees. Mahalanobis also played a major part in developing India's first and second Five-year Plans which marked the beginning of that country's journey along the road of industrialization.

But perhaps his greatest contribution to the world was the founding of the Indian Statistical Institute: a facility for high quality research, training and execution of large scale projects. As its Founder-Editor, he also published the statistical journal, Sankhya , around the same time.

Throughout his life, this dis-

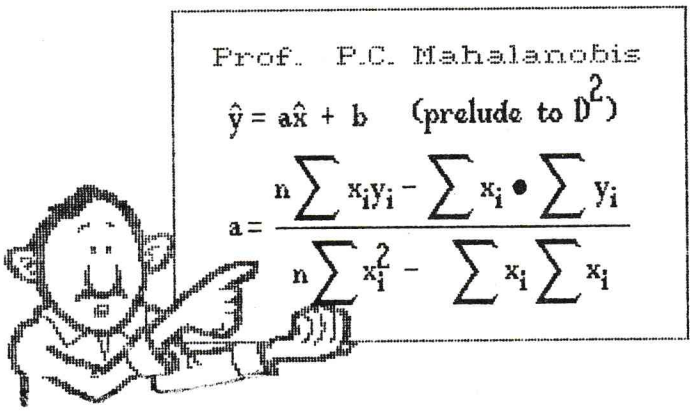
tinguished scientist showed a logical mind, courage, love for art and concern for his fellow human beings. For example, in his youth there was his involvement in the Chattra Samaj, a student platform through which young people could meet and discuss their ideas on social and moral issues. The Chattra Samaj had a membership clause that stated that no member could drink, smoke, or watch plays on the public stage. Such things were anathema to Mahalanobis, because he felt that such vices were detrimental to the potential growth of man. Even though he did not approve of such activities, he started to rally to withdraw the clause. Another action against the system was the matter of registering Brahmo Samaj marriages. Mahalanobis thought the action was redundant because this ritual, according to the Brahmo Samaj practice, had already been recognized as legal in various high courts. Because of these convictions Mahalanobis did not register his own marriage, much to the chagrin of his father-in-law.

Mahalanobis had a close friendship with the great Bengali poet, Rabindra Nath Tagore, of whom he was a keen follower. Religious leaders of Mahalanobis' time shunned Tagore and his work though religion was a large part of Tagore's life, and despite the fact that many of his devotional songs were published in the Brahmo Samaj. This led Mahalanobis to publish a highly controversial pamphlet entitled "Why we want Rabindranath". This publication brought to light many of Tagore's values and convictions. As Tagore's work matured, the trend toward nationalism he was taking became evident to Mahalanobis and he consequently gave his full support to Tagore. Mahalanobis also accompanied Tagore on his now famous trip to Italy. While in Italy, Tagore wrote his historic letter to Lord Chelmsford relinquishing his Knighthood as a protest against British atrocities in the Punjab state of India.

In all, Professor Mahalanobis was a significant individual in shaping statistics, both in India and around the world. His uniqueness lay in his contributions to both science and society. It is C.R. Rao, ex-director of ISI, who summed up Mahalanobis best -

...a physicist by training, a statistician by profession, and an economist by intuition.

Debashis Sinha



Ravi Shankar - His Life and Music

On 7 April, 1920, in Banaras, India, the world's greatest sitar player was born. Pandit Ravi Shankar, as he is so called because he is the true maestro or 'Pandit' of sitar playing, would soon capture the hearts of Indians and eventually world admiration with his uniquely enchanting music and personality.

Coming from a cultured Bengali family background, Shankar's desire to study and learn Indian classical music developed at a young age. After watching such eminent musicians as Yehudi Menuhin, Pablo Cassals, and Toscanni perform, seeing some of the best ballets and listening to great symphony orchestras and operas, a keen desire to make a career of music was sparked within him. Apart from classical music, Shankar holds a special place in his heart for Indian folk music. As a young boy, while he was staying with his grandmother at Nasrathpur in the Ghazipur District, he often stayed up at night and listened to folk songs being sung by the villagers. Thus, Shankar's music sometimes contains strains of folk influences which makes it more appealing.

Shankar received early training in music and dancing from his well-known brother Uday Shankar and up to the age of ten he had little formal education. In 1930, he went to Paris with Uday to join their father and receive some schooling. After a few years in school, Shankar began his future career by performing with his brother's touring dance troupe.

In 1938, Shankar went to Maihar to learn how to play his most beloved instrument, the sitar, from the doyen of Indian instrumental music, Ustad Allaudin Khan. The Ustad warned him of the hardships involved in the 'Guru-Shishya' tradition but Shankar was willing to bear any hardship for the sake of mastering the sitar. His rigorous training included nearly 18 hours of practice each day. During Shankar's intensive study under Ustad Khan, his fellow classmates were the Sarod player and good friend Ali Akbar Khan and sister Annapurna, the Surbahar player who later became his wife.

Shankar gave his first solo performance in Allahabad in 1938, and by the mid-1940's, he had embarked on a successful performing career. Shankar toured Europe and the United States in 1956-1957. He participated in the 10th Anniversary Celebration of the United Nations in 1958 and played for the UNESCO Music Festival of the same year in Paris. In 1963, he gave three "greatly admired" recitals at the Edinburgh Festival. Shankar appeared in the United Nations Human Rights Day concert in New York in 1967, where he performed a duet with Yehudi Menuhin. Also in 1967, he appeared with George Harrison, a member of the Beatles, at the Woodstock Festival, and performed in two concerts in aid of East Bengal. Due to his immense popularity and demand, Shankar often spends most of his time abroad.

The Indian National Orchestra was founded by Shankar for the listeners of All-India Radio, where he worked from 1949 to 1955 as the Director of its instrument ensemble. In 1962, Shankar started the Kinnara Music School in Bombay and five years later in 1967, while he had been teaching extensively in the United States, he established a branch of the school in Los Angeles. George Harrison, one of the Beatles, went to India to learn how to play the sitar from Shankar. Shankar also founded the International Dolls' Museum and the Childrens' Library and Reading Room.

A very progressive artist, Ravi Shankar has entered and been first in many fields of music. He has composed many ensemble pieces for All-India

Radio's instrumental ensemble. Shankar was India's first musician to compose 'light melodies' and conduct his own music. A perfect example of this 'light melody' is his well-known composition "Caravan", which creates the slow-moving mood of a desert caravan. Ragas composed by Shankar are the Raga Jogeshwari and the Raga for Mahatma Gandhi, both written in 1981. Shankar has written two sitar and orchestra concertos. The first one written in 1971 was commissioned by the London Philharmonic Orchestra and is widely performed and recorded. Shankar wrote remarkable scores for the well-known ballets, "Immortal India" and "Discovery of India" based upon the book written by Jawaharlal Nehru. Also written by Shankar was the score for the "Samanya Kshati" ballet, which was based upon Rabindra Nath Tagore's poem and was choreographed by Vaijayanthimala. By way of films, Shankar has written scores for Satyajit Ray's "Pather Panchali", "Aparajito", and "Apur Sansar". He also wrote scores for other Indian films: "Nava Rasa Ranga", "Charly" and "Kabuliwala". When Shankar wrote scores for such films as "Chairy Tale" and "The Flute and the Arrow", he became the first Indian to compose music for Canadian films.

For his achievements in the field of music, the list of awards he has received seems almost endless. In 1962, Shankar received an award from the National Academy of Music, Dance, and Drama and also the Presidential Award of India. The National Academy of Recording Arts and Sciences honored him in 1966, and the next year, he received the 'Padma Bhushan' award from the Government of India. Shankar received honorary Doctorates from the University of California in 1968, the Indira Kala Sangeet University and the Indian University of Music in 1972. In 1975, he received the Music Council UNESCO Award, and in 1981, he was honored with the 'Padma Vibhushan, the second highest decoration from the Government of India. Shankar also received awards from UNICEF for his work in Bangladesh, the Venice Festival Award, and the Berlin Festival's highest award, 'the Silver Bear' for his musical score in the film "Kabuliwala".

Ravi Shankar's unique style was developed from his mentor Allaudin Khan's teaching. His impressive use of lower scale is derived from the traditional Vina style, from which each 'alap' (introductory improvisations of the raga) is based. Shankar uses asymmetrical and unusual 'talas' (rhythmic cycles) to create rhythmic variations in his instrumental compositions. Numerous ragas which include Pancham-Segara, Raisya, Bairag, Nat Bhairav, and Ganeshwan, as well as several derived from Carnatic ragas are credited to his creation.

An amiable person, Shankar is of medium height, soft spoken, and always well-dressed in silk kurtas and paijamas. He is a man with a fine sense of humor which shines through to all who meet him. Once, due to a sore on his upper lip, Shankar was unable to shave, and during a recording session he told a friend, "Look out for me, for these days I look more like 'Bandit' Ravi Shankar than 'Pandit' Ravi Shankar." Aside from his mother tongue of Bengali, Shankar speaks English, Hindi, and French with equal fluency. During his rare moments of spare time, Shankar likes to read light fiction and murder mysteries. He is especially fond of perfume and 'agarbuttis', and his home and places of performances are filled with their sweet scent, much like that of a place of 'puja'. Perhaps for Shankar, playing the sitar is like performing a puja, in which one is lost in prayer and devotion.

Ravi Shankar's international renown and association with the Western musicians have contributed to the popularity of Indian music in the West. His zealous efforts to increase foreign

awareness of Indian music have been amply rewarded, as evident by the world acclamation of his enchanting sitar recitals. Furthermore, he has been and continues to be instrumental to the spread of India's magnificent heritage. Ravi Shankar is a source of pride for all of his fellow Indians.

Ratna Das

CANADIAN & INDO-CANADIAN ISSUES

Computer Industry in Canada

Canada will spend approximately 9 billion dollars on computer goods and services in 1985, making the computer industry one of Canada's largest industries. Two billion dollars will be spent on in-house computer hardware and software. In-house computer personnel will account for another 3 billion dollars. Data transmission services will cost 700 million dollars. Another 1.8 billion dollars will be paid to computer service bureaus for their services, and the remaining 1.5 billion dollars for various other goods and services.

Computer hardware includes central processors, memories and peripheral devices. Software is usually written by firms that either make the corresponding hardware or are specialized in that field. Almost all the major computer equipment suppliers are foreign based. Because of this fact, a large trade deficit of 90 percent of total expenditures on equipment is created. The only large exports on the part of Canada are devices which perform communications and specialized functions. If the foreign owned companies invested as much into Canada as they invest, proportionally in their country, there would be a large increase in the number of jobs in the industry as well as more exports from Canada. Also, if these firms put more investment into research and development, many more jobs would be created, helping Canada advance in the hi-tech field. Firms presently report that 2 percent of revenue is invested in research and development. When compared with a figure like 6 percent worldwide, 2 percent is clearly too low.

The 3 billion dollar expenditure on computer personnel, as well as the 700 million dollars on data transmission is almost all spent within Canada. Hardware and software used by the data transmission firms cost 200 million dollars. Because a 90 percent trade deficit can be applied to this figure, an additional 180 million dollars is added to the trade deficit.

Only purchased computer services are of great contribution to Canada's economy. Firms of this type have had some major achievements in the past. Interprovincial Pipeline Ltd. has designed and used a computer network to

monitor and control its pipelines. The software, communications, and processor control incorporated within this system was a decade ahead of its time. Another Canadian achievement was the development of a prototype which could have become the world's first minicomputer. This prototype was developed at the University of Toronto. In the early 1960's, a nuclear instrument, the kick sorter, was invented at the Atomic Energy of Canada's Chalk River laboratories. With small changes, this too could have become a minicomputer. Ferranti Packard Ltd. created a powerful time-sharing computer in the early 1960's as well.

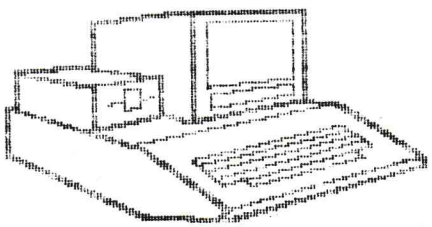
Canadian expenditures on computer and communication research and development will be about 300 million dollars. Of this, 25 percent will be spent in government laboratories, another 25 percent in universities and the remainder in the private sector. A mere 100 million dollars will go to Canadian-owned firms, whereas 8 billion dollars is spent on the world's ten major companies. Thus, Canada is not likely to have any great impact on the world market. Only small and specialized "niches" will be created by Canada in the market with most of the research and development which is done in Canada taking place in Ontario.

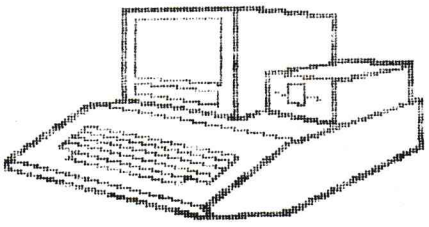
Some prominent work in computer industry is now being done in Canada. Mitel has manufactured CMOS chips in Canada until recently, when it was taken over by a British-owned firm. Northern Telecom is known worldwide for its digital switches used in telephone systems. Some major software packages, including operating systems, and application software is currently being written in Toronto. Many popular computer clones are being manufactured in both Toronto and Vancouver.

With an annual growth rate of total expenditures in computer goods at 12 percent, the computer industry is fast becoming one of Canada's primary industries. By 1985, 121,000 computers are expected to be used in Canada. Some experts say that by the year 2,000, the computer industry will challenge the transportation industry as a contributor to Canada's gross domestic product, making the computer industry vital to Canada's economy.

The computer industry is one of the fastest growing fields, and the future of the industry lies in Canada's youth. It is now the responsibility of Canada's youth to get serious about the computer industry to assure its successful future.

Debashis Roy





Bengalis and South Asians in Canada - Demography

There seem to be few statistics as to how many Canadians of Bengali extraction there are living in Canada. Norman Buchignani, Associate Professor of Anthropology in Lethbridge, Alberta, has recently estimated the current population of Bengali and other basic South Asian Canadian ethno-cultural groups living in Canada.

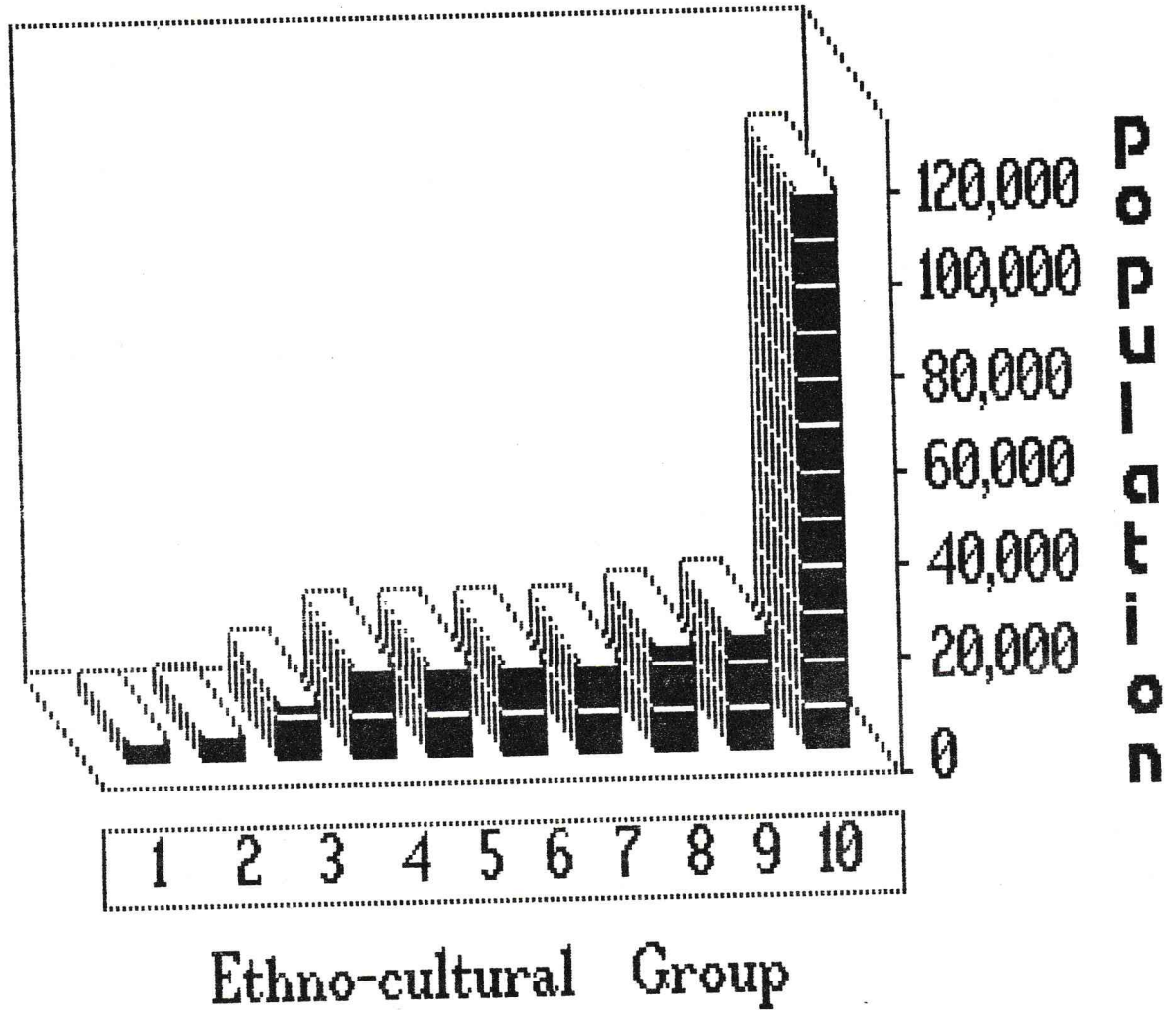
As of 1985, 3000 Bengalis have settled in Canada. Bengali people in Canada originate mainly from two geographical areas: Bengal in India, and Bangladesh. Bengalis from India mostly profess the Hindu religion; they are estimated to be 2000 in number, the majority living in the Toronto and Montreal areas. The second group of Bengali people originates from Bangladesh and profess the Sunni religion; there are about 1000 of them settled in Canada.

Other ethno-cultural groups from South-East Asia in order of their population size, are listed in Table 2.0. The primary place of origin and the majority religions of these groups are also included in the listing.

Table 2.0 Demographic parameters of South Asians in Canada

Group	Population	Origin	Religion	Language(s)
10) Sikhs	120 000	Punjab, India;	Sikh;	Punjabi
9) Pakistanis	20- 25 000	Pakistan;	Sunni, Moslem;	Urdu
8) Trinidadians	23 000	Trinidad;	Christian, Hindu;	English
7) Ismallis	20 000	East Africa;	Ismali, Moslem;	Gujarati
6) N. Indians	20 000	(Uttar Pradesh & Punjab, India);	(Hindu, Moslem);	(Hindi, Punjabi)
5) Guyanese	20 000	Guyana;	(Hindu, Christian, Moslem);	English
4) Gujaratis	20 000	Gujarat, India;	Hindu;	Gujarati
3) Fijians	12 000	Fiji;	Hindu;	(English, Hindi)
2) S. Indians	5 000	(Kerala & Madras, India);	Hindu;	(Tamil, Telugu, Malayalan)
1) Sinhalese	4 000	Sri Lanka;	Buddhist;	Sinhala

Population by Group No.



Thus it is quite evident that Bengalis are one of the smallest ethnic groups in Canada. For what we know of them, most of these are white-collar workers holding responsible positions in Canadian academia, industry, and government. As well, a considerable number of them are in private medical practice in both rural and urban areas. To our knowledge, Canadian censors have not categorized Bengalis separately in the past and many of the accomplishments of this small but highly skilled immigrant group have not been officially documented. Thus there is an urgent need for conducting a census for the vital statistics and accomplishments of the Bengali ethno-cultural group in Canada.

Jay Sinha

INDIA MOVES WITH THE TIMES

Science and Technology in Modern India

The impact of science and technology, as the standards by which development is judged, abounds in nearly every facet of Indian life. From the mundane to the esoteric, from developments in rural communities to discoveries in outer space, India has launched massive campaigns in all quarters to reap the benefits of twentieth-century technology, economy, and efficiency. Despite the debilitating effects of massive population pressure, widespread illiteracy, cultural and linguistic heterogeneity, political turmoil, and border problems with neighboring countries, India has managed to keep abreast of science and technology - nothing short of impressive for a nation that saw the rudiments of indigenous manufacture and industrialization develop only as recently as three and a half decades ago, after independence from Britain's imperialism and large-scale economic exploitation.

As a result, India's immense technical growth since Independence shows excellent promise for more rapid growth in the future. Armed with technology, increasing self-reliance, and a large pool of qualified scientists, engineers, and doctors, among others, India is briskly following the pace of developments in energy, electronics, agriculture, medicine, and technical expertise. In addition, India's research into new frontiers provides increasing hope of a prosperous, event-filled future.

RESEARCH IN ATOMIC POWER

One of the main areas in which immense development has taken place in India has been in the area of research and development of energy sources.

By having built several reactors domestically, India is internationally regarded as one of the countries which have acquired the capability of manufacturing nuclear weapons. Nevertheless, India stands committed to energy use for peaceful purposes only, and has made considerable progress in that direction. The Bhabha Atomic Research Centre (BARC) is the main research centre in India for the development of atomic energy. It has built a number of research facilities which include a gamma-garden at Trombay, for carrying out research in the evolution of improved seeds for boosting agricultural production in the country. It has also put up a Seismic Research Station (SRS) at Gaurividanur near Bangalore in Karnataka to detect underground nuclear explosions and its biomedical centre is evolving new methods for the diagnosis and treatment of diseases with the help of radioisotopes. The isotopes laboratory is now producing and processing many radioisotopes that are widely used in medicine and industry.

In addition to the production of radioisotopes and their applications in agriculture, biology, industry, and medicine, BARC also supports four functional research reactors. The first two reactors, the ASPARA and CIRUS (Canada-India Reactor), export many of their over 350 radioactive products to developed countries such as France, Sweden, Hungary, and Australia, while the comparatively more recent reactors, ZERLINA (Zero Energy Reactor for Lattice Investigation and New Assemblies) and PURNIMA (Plutonium Reactor for Neutronic Investigation in Multiplying Assemblies) are used extensively in indigenous research that include studies of Uranium Heavy Water Lattices. Besides SRS and BARC, other institutions engaged in nuclear research in India include the Saha Institute of Nuclear Physics in Calcutta, the High Altitude

Research Laboratory in Gulmarg, the Indian Cancer Research Centre in Bombay, and the Reactor Research Centre for studies in fast reactor concepts at Kalpakkam near Madras.

Perhaps one of the most fruitful outcomes of this nuclear research for India in the near future will be the large scale utilization of atomic energy, a projected total production of nearly 10,000 MW of atomic power, by the end of the present century.

DEVELOPMENT OF NEW ENERGY SOURCES

In tandem with the development of atomic power as a viable source of large amounts of energy, more conventional sources as well as newer, "exotic" sources of energy are also being used to generate power.

At present, the energy needs of the nation are largely met by rich reserves of coal, oil, and natural gas with which the subcontinent is reasonably well supplied. Supplying a country whose present consumptions of 40 million tonnes of oil and over 140 million tonnes of coal has been made possible only by (and because of) remarkable scientific progress in the last three decades. Technological advances and research efforts have produced new techniques in seismic surveying, in reservoir engineering, and in oceanographic engineering for offshore pipelines and oilwells, the results of which are being used to exploit the oceans off the Bombay coast and the eastern end of the Deccan traps.

Of course, these reserves will not last forever and India has taken on a prudent initiative in the development of alternate sources of energy, partly to meet national demands, and partly, because of increased awareness and pressure from internal environmental agencies for conservation and pollution control. Although atomic energy yields clearly supersede those obtained from other smaller scale energy sources in India today, the large number of alternatives are a clear testimony to a promising future. Such efforts have been directed at the development of photovoltaic or solar cells of increasing efficiency, wind turbines, biogas utilization (such as those obtained from methanogenic microorganisms), biomass conversion, hydroelectric power generators, and magneto-hydrodynamic (MHD) power generators like that existing at Tiruchirapalli. In fact, the efforts of such developments have already been put to use practically, on a small scale at least, as some villages have been equipped with solar-powered streetlights; photovoltaic cells have been successfully utilized on offshore platforms and also on wireless systems.

While the development of these energy sources have been directed towards purely practical ends, other areas of research engaging the efforts of a handful of nations, India among them, have been directed towards a more ambitious campaign. This campaign is directed towards conquering the most elusive frontier to date - the frontier of space.

SPACE RESEARCH

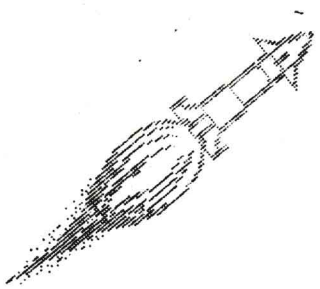
Many nations have contemplated reaching out and "touching" the stars, but only a few have an organized space program, and even fewer have actually developed the technology and successfully used it to venture out into that last frontier. India is one of those successful countries.

Although India's space program began with rocket experiments that were carried out from the Thumba Equatorial Rocket Launching Station near Trivan-

drum as early as 1963, rapid development of space technology and its applications did not occur until the development of the Department of Space and the Space Commission in June 1972 with headquarters at Bangalore. Since then, this department, represented through the Indian Space Research Organization (ISRO), has been engaged in the development of indigenous capabilities in advanced aerospace engineering, rockets and satellites, and also the development of capability within the country for various satellite applications including remote sensing, meteorology, geodesy and navigation, and the establishment of facilities for these activities.

In the process, the Department has made full use of the achievements in projects designed to secure concrete socio-economic benefits to the country. In particular, progress has been made in the Satellite Instructional Television Experiment (SITE), the Satellite Telecommunications Project (STEP), the Ariane Passenger Payload Experiment (APPLE), the Satellite for Earth Observations (SEO) venture, the multifaceted Indian National Satellite Communications System (INSAT) program, and mature development work in remote sensing.

Both SITE (1975-76), which allowed educational programs on animal husbandry, agriculture, family, and health planning to be transmitted to approximately 2400 villages in six Indian states, and STEP (1977-79), which allowed the testing of communications devices, were based on foreign satellites. The experience gained from these experiments was used to develop the 673-kg APPLE, India's first three-axis, body-stabilized, geostationary, experimental C-band communication satellite that was successfully lifted into space on 19 June 1981 by the European Space Agency's Ariane rocket. India was the ninth country to build such a geostationary satellite after the U.S.A. (1963), the U.K. (1969), the U.S.S.R. (1974), France & West Germany (1975), Canada (1976), and Italy & Japan (1977). After successful testing of response to experiments in computer (digital) communications, national TV and radio hookup, and subscriber trunk dialing, the INSAT systems were developed.



The INSAT-1A was India's first operational multipurpose domestic satellite for use in enhancing communications, meteorological and television relay, as well as the radio broadcasting capabilities of India. It was launched on 10 April 1982 atop a U.S. Delta Rocket from Cape Kennedy in the U.S.A. This effort failed completely, when on 6 September 1982, after 148 days in orbit, fuel necessary to fire thrusters, was depleted due to a solar sail that would not deploy.

Its successor, the INSAT-1B, was launched soon after, being deployed by the Space Shuttle in September 1983, and has been operating since 15 October 1983. A third counterpart, the INSAT-1C, is due to be launched in mid-1986 to act as a back-up satellite to the INSAT-1B.

Eventually, the INSAT-I series, built by the Ford Aerospace Corporation in the U.S.A., will be replaced by the indigenously built INSAT-II series, currently nearing completion.

This satellite technology is truly another one of those modern conveniences we have come to take for gran-

ted. As it was considered novel research only as recently as 15 years ago, it is remarkable how dependent the populace has become on one of its most important uses today - that in the area of remote sensing.

REMOTE SENSING TECHNOLOGY

The remote sensing technology in India, used for such things as geological prospecting, surveying, and monitoring of meteorological and climatic developments, is surveyed by domestically built satellites and launching vehicles. The satellite technology, essentially replacing aerial tasks previously performed by aircraft, was given impetus only after the successful 4-year orbit of India's very first scientific satellite named Aryabhata (360 kg). In orbit from 19 April 1975 to the April of 1979, it placed India as the eleventh space power in the world after the U.S.S.R., the U.S.A., France, Britain, Japan, Canada, China, Italy, Australia, and West Germany. The Aryabhata was followed by Bhaskara-I (444 kg) and -II, and eventually, the lighter satellites Rohini-I (35 kg) and -II (38 kg). Rohini-I and -II were launched by indigenous Satellite Launch Vehicles (SLV-3 and SLV, respectively) from Sriharikota, India's "Cape Kennedy", on 18 July 1980 and 31 May 1981, respectively. These successes have led to further SLV designs: the Augmented Satellite Launch Vehicle (ASLV) for approximately 150-kg satellites and the Polar Satellite Launch Vehicle (PSLV) for approximately 1000-kg satellites.

The future of Indian space technology also seems to have much to offer in light of the recent joint Indo-Soviet Salyut-7 mission, that started on 3 April 1984 and involved the first Indian astronaut in space, Rakesh Sharma. He performed several biomedical tests and other onboard scientific experiments during the 8 day orbit with other Soviet cosmonauts.

DEVELOPMENTS IN BASIC SCIENCES

Natural Resource Management

Most research in India has been directed at fulfilling the specific needs of the country while also solving special internal problems and concerns.

Although India's Green Revolution since Independence has allowed her to become nearly self-sufficient agriculturally, she has even more ambitious desires to gain self-sufficiency in other areas. Consequently, India has adopted a policy of self-reliance that aims to boost indigenous development and capability.

India's policies of self-reliance have necessitated the development of science and technology not just as an end to themselves, but as a means of meeting the needs of a nation that insists on supplying itself. As such, the development of natural resources has been of prime importance to India in all of its Five Year Plans during the past three decades and shows promise of the same in the seventh Five Year Plan to be formulated sometime in 1986 or slightly thereafter.

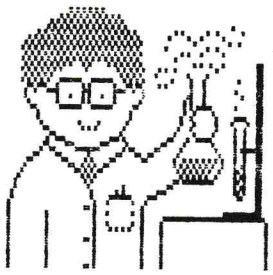
The onus of responsibility for the discovery of these natural resources lies with the National Geophysical Research Institute (NGRI) because the prevalent premise, that India has rich resources, implies that a geophysical analysis of the subcontinent will pinpoint the future sites of discovery of these resources.

Fortunately, the NGRI is directed by an ambitious personality in the personage of Dr. Vinod Gaur. Through the course of his tenure, his zealous attempts towards complete modernization and ambitious desire to fully delineate the Indian lithosphere have revealed interesting features of the Indian subcontinent.

One such promising discovery, is that of the Deccan Traps. Seismic

sounding techniques have revealed that the west coast of the Deccan peninsula consists of a 1.5 km thick, lens-shaped mass of igneous rock that thins towards the east. This offers hope for easy recovery of potentially substantial reserves of coal beneath the relatively thin igneous rock layer.

Medical Microbiology and Molecular Biology



Other oases of hope for India lie in the research and development carried out in a multitude of laboratories across the nation. The experiments carried out by microbial and medical researchers for example, are aimed at solving problems peculiar to India including the many cases of leprosy (nearly 3 million patients), high incidences of mala- ria and especially, the widespread manifestation of oral cancer. One of the fruits of their efforts has been the production nearly two years ago of two new vaccines for the treatment of leprosy. Developed independently at two different medical centres, these were awaiting field trials, at last word.

Other projects with such dints of Indian character are to be found in Indian researchers' attempts to discover new ribonucleases similar to those found in milk. It has been found that among Indian women, Parsee women, especially, not only have lower concentrations of RNAase in their mammary glands but are also prone to mammary cancer. The discovery of the ribonucleases would thus aid researchers in establishing an exact cause-effect mechanism or relationship that is not clearly understood or established at this point.

By far, the most complex social problem yet to be resolved in India has nothing directly to do with infections, diseases, or deficiencies. It is the problem of the staggeringly high population growth rate of just under 2.5 % per year. By the principles of demographic transition, the increased life-span of the Indian individual, which has more than doubled since Independence due to better health care, coupled with the high birth rate, is bound to produce a chaotic population explosion, the magnitude of which has never before been seen in this world.

Fortunately, science has again been at work in India in this area in attempts to reduce the size of the national population that presently is in excess of three quarters of a billion people. Laboratories across the nation have been involved in the search for new and better contraceptives through natural and synthetic organic reactions based on knowledge acquired from the processes of fertility and reproduction. Although progress is still slow in most regions, some places, such as the southern state of Kerala now show a minimal growth rate, due only because of increased longevity of the populace. These promising results thus show that some areas of the subcontinent could benefit from the Indian premise that science and technology, as the tools of tomorrow, may be the the most effective weapons against age-old problems.

OCEANIC ACHIEVEMENTS AND DISCOVERIES

Deep Sea Explorations

Another frontier of research in India includes the seas and oceans. Most of India's oceanic research has been conducted by the National Institution of Oceanography (NIO) which has

been one of the most prolific contributors to the scientific advancement of the Indian subcontinent. With its two research vessels, the 1555-tonne RV Sagar Kanya and the 1900-tonne RV Gaveshani, the NIO not only launched the Indian Antarctic Expedition of 1982 but has also been involved in mineral scavenging in the Indian Ocean for many years. As a result, polymetallic nodules were found in 1981, giving rise to deep-sea mineral deposit explorations in the hopes of an ensuing industry. Also, numerous chemicals and pharmaceuticals have been extracted from various marine biota, flora, and fauna that may eventually find medicinal use as antihypertensives, among other things.

The NIO-initiated research of Antarctica is also directed towards this same goal of finding natural mineral deposits and other such commodities.

Research in New Frontiers to the South

Research in Antarctica has been dubbed as "exploring the unknown continent of unknown wealth". The Indian National Science Academy at New Delhi has been involved in this research since 1982. Besides the search in Antarctica for resources, India has also involved herself in pure research. She has established a permanent observatory in Antarctica near the Princess Astrid Coast and has carried out many experiments there that eventually earned her a spot on the Antarctic Treaty Organization in 1983. Some of the research work included bacterial flora count (consisting mainly of Bacillus, Micrococcus, and Corynebacterium) in four fresh water lakes found by the Indian team near the Dakshin Gangotri hills, and snow and ice studies of the shelf with respect to thermal profiles, density studies, stratigraphy, and dating. Meteorological measurements were conducted with the aid of 55 balloons, radiation reflection and attenuation were measured as was krill biomass; hydro-acoustic studies of the pack ice were also completed. A permanently staffed base and year-round observations in Antarctica speak more than enough for India's vested interest in that frontier to the far south.

ENVIRONMENT AND CONSERVATION

Although exploitation of land resources, indigenous or otherwise, seem to be the bottom line of the Indian self-reliance philosophy, India has nevertheless slowly learned the cardinal rules of conservation of environmental products and by-products. The establishment of the autonomous Department of the Environment in 1980 by the late Prime Minister of India, Indira Gandhi, bears witness to that vision of preservation. At present, the administration of matters in this area is conducted by Dr. Triloki Nath Khoshoo, Secretary to the Government of India at the Department of the Environment.

Khoshoo's plans for the future include attempts to reserve at least a dozen sites for the preservation of certain biosphere reserves or habitats, and a more immediate plan for the setting up of five gene banks of plant material.

In tandem with this is India's forestry program. Although the reforestation of India has not yet reached the one third of the available land level outlined in India's earliest Five Year Plan, it has reached the 10-12 percent level. If more stringent control can be had over animal grazings (to prevent the deaths of saplings and young trees) and firewood collection by villagers and others, India can hope to have almost 20-25 percent of the usable land forested and maintained within the next few years.

Unfortunately, pollution control, for water in rural areas, and of dust in urban settings, have not yet been taken into serious consideration and resolved. This must be addressed to complement India's other achievements involving environmental concerns.

PROSPECTS FOR A BETTER TOMORROW

It is clear that with the present successes and promises of science and technology in all the aspects of life, India has a bright future to look forward to and aspire towards. The solutions to problems of the present age, as ideals in themselves, provide the impetus and initiative needed to deliver India from contemplating its own problems to address more universal issues that concern not only all humans, but all life and the natural resources with which we coexist on this planet. As modern science is providing India the tools to break the shackles of its bondage to its own concerns, so it represents the guiding star towards the adoption of more international, and indeed universal concerns. By helping us to cope with the problems of the present day, science, in India as elsewhere, is truly preparing us to meet the challenges of tomorrow.

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