

THE INDIAN BOTANIC GARDEN

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The Indian Botanic Garden, Calcutta was the world's largest Botanic Garden upto the middle of the 19th century; it is the oldest in South and South East Asia. The original name the *Botanic Garden*, Calcutta, was christened to the *Royal Botanic Garden* in 1857 and changed to the present form in 1950. Organised by the East India Company in 1787,* the control of the garden was passed over to the State Government in the latter part of the last century and taken over by the Government of India in 1963. Set for a horticultural nursery for economic and commercial expectations it was soon transformed to a botanic garden and elevated to a leading centre of botanical research. Situated on alluvial soil in a cyclonic zone, the garden suffered set back several times (particularly in 1842, 1864, 1867, 1902), but withstood the test of time. Botanical Survey of India was initiated here by William Roxburgh, extended by Nathaniel Wallich and formally established by George

King. Contributions of the Indian Botanic Garden are too numerous to discuss here in detail. Some salient features are presented in this paper.

Robert Kyd who initiated the garden tried to grow every desirable plant of every country during his tenure of 6 years. He made efforts to introduce mahogany, teak, oak, tea, cardamom, pepper, nutmeg, cloves, cinnamon, Persian dates, Persian tobacco, English apples, cherries, apricots, bread-fruit tree, sandal-wood and many others. But as was to be expected most of them perished in the climate and soil of Calcutta. Kyd's failure paved the way for a Botanic Garden. At the time of his death the garden had 300 species.

William Roxburgh took over the charge of the garden in 1793 and continued for 20 years. While at Samalkot for 8 years from 1785 to 1793 he explored, studied the local flora, discovered wild pepper, established experimental plantation, and had the plants illustrated. In this way he studied the plants of the Coromandel Coast (Roxburgh 1795-1820). In the Indian Botanic Garden, he initiated Botanical Survey of India. He did not undertake exploration himself but detailed his sons William and John and other staff for collection. He received plants from Madras, Sylhet, Nepal, Burma and Malaysia. Besides,

* The exact date of establishment is not clearly known. The proposal was submitted by Robert Kyd on July 1, 1886, forwarded by the Governor General on August 21, 1786, approved by Joseph Banks (who was in-charge of Botanical establishment in England) on July 6, 1787, and sanctioned by the East India Company on July 31, 1787. However, the commencement of the garden was intimated to the company by the Governor General in the letter dated July 27, 1787.

he had about 60 donors who sent plants or seeds to him either because they were showy or useful or something unfamiliar which might be studied. He grew them in the garden according to Linnean system. Large number of genera, the number of species belonging to different genera and the number of varieties of such species thereby brought together and placed at one point afforded facilities for comparative study, which might have been difficult without the aid of such an institution. He used to study a plant as soon as it flowered and got it illustrated in colour. Such coloured plates grew to 2533, representing almost the same number of species. He was the first to draw a systematic account of plants of India (Roxburgh 1820, 1824, 1832). 31 genera are credited to him by Hooker (1872-1897). He did not give due importance to herbarium specimens. Many of his specimens were incorporated by Wallich in his collection and distributed to various herbaria.

He described about 3500 species of which 1510 were new and noted in his 'Hortus Bengalensis' (Roxburgh 1814). It includes 858 species of timbers, 43 species of *Hibiscus*, 35 species of *Ficus*, 20 species of *Jasminum*, 18 species of *Oak*, 17 species of *Curcuma*, 10 species of *Dalbergia* etc. Nearly all the plants of Scitamineae discovered upto that time were planted in the garden. Arrowroot formerly known only from the West Indian *Maranta arundinacea* was produced in great abundance from the tubers of several species of *Curcuma*. He established jute and exported the first 100 tons of fibres to the European market. He observed that Coffee and Pimento prosper as well in Bengal as in the native soil. Nutmeg produced fruits every year. Tea known to merchants for a century was introduced into the garden soon after its foundation. It was reintroduced from China in 1793. The bush grew but it was always sickly, though it did not die. In

1820 Edward Gardner sent a twig from the cultivated bush in Nepal to Wallich. Soon it was established that tea and teak do not grow well in alluvial soil of Bengal. Cultivation of flax, hemp, ramie, vanilla, and a host of many others was attempted by him. It was evident that the climate of Bengal was unsuitable for these equatorial species.

The garden rose to the peak of its glory as one of the most important centres of Botanical Research in the world. Roxburgh's contributions made botanists of other parts of the world interested in Indian Botany. One of the greatest botanists of his time, he is rightly known as the father of Indian Botany.

The earliest map that could be traced of the garden is of the year 1810, prepared by Roxburgh. He laid out a Linnean garden. There were wide borders of selected plants spaced to exhibit the Linnean system of classification. Nurseries were scattered. Maria Graham one of the visitors to the garden in November 1810, was highly impressed with the large collection of living plants and recorded her delight with the order and neatness of every part of the garden.

Francis Buchanan (*nee* Hamilton) enquired into natural resources and explored Burma, Chittagong, Mysore, Nepal, Bengal, Assam, Bihar and Uttar Pradesh. He held the charge of the garden from 1814 to 1816.

Nathaniel Wallich took the charge of the garden in 1817, and continued for 30 years up to 1846 with some periods of long leave. He held the responsibility of teaching in the Medical College, supplying drugs to the Govt. Medical Store and supervising the teak plantation in the country. He undertook extensive survey of large parts of the Indian subcontinent. He himself collected through the Submontane forests of Uttar Pradesh into the Himalayas to Kathmandu, through the

Gangetic Plains, the Brahmaputra valley, Khasi Hills, Burma, Penang and Singapore. He had collectors to send plants from Kumaon, Nepal, Chittagong, Sylhet and Tenasserim. The enormous collection he accumulated could not be studied by him alone. He took all the specimens that had accumulated in the herbarium and in the India House, London and assigned them names and numbered upto 8322. He sorted them into 8 sets and distributed to 20 centres of botanical research in 8 different countries, so that specialists could study the respective groups. But it did not work as expected. Many of the *nomina nuda* included in the list were later validated by descriptions (Wallich 1824, 1828-1832; G. Don 1831-1838). 61 genera are credited to him in J. D. Hooker's Flora of British India.

Wallich was charged for neglecting the garden. 40 acres of land including the teak plantation was given up by him in 1820 for the Bishop's College, subsequently changed to the Bengal Engineering College. Experiments on crop plants were entrusted to the Agri-Horticultural Society in 1836, for which the Society was allotted 2 acres of land gradually extended to 25 acres. Wallich was a great scientist but the explorer in him was greater. He was less of an economic botanist and little appreciative of gardening. He spent most of his time and energy in exploration, that he could not digest. He could not pay sufficient attention to the development of the garden. However, it was known as the most beautiful garden in the East.

William Griffith held the charge of the garden for two years during 1840-42. He went on botanical missions to Assam, Khasi Hills, Burma, Bhutan and Afghanistan, and collected 9000 species. He published 22 scientific papers and left behind voluminous manuscripts and sketches which were posthumously published (Griffith 1847-1854,

1850). According to King no botanist (of India) ever made such extensive exploration nor himself collected so many species (about 9000) as Griffith did during the brief thirteen years of his Indian career; none ever made so many descriptions of plants from living specimens. 20 genera are attributed to him in the Flora of British India (Hook. f. l.c.). He reorganized the herbarium and prepared a list of books in the library.

Griffith proposed fundamental changes in the garden. He destroyed the amenities as a pleasure garden. He gathered into one place nurseries that were scattered about the grounds. He planned for a natural system (*i.e.*, a border of plants depicting the Natural system) flanked by a garden of medicinal plants and a garden illustrating the useful plants of lower Bengal. He arranged the beds in concentric rings, the central the smallest for cryptogams, the second for monocot, and the two outer for dicot. The area in front of the conservatory was cleared for the natural garden to accommodate the circles. Trees and large shrubs were destroyed. They were to be in groups of family members. Shade loving ferns did not grow in the sun in the central position.

H. Falconer took charge of Saharanpur Garden from J. F. Royle, where he took interest in economic plants and collected in Kashmir and Kumaon. In 1847 he was appointed the Superintendent of this Garden and held office till 1855. He sent 76 cases of specimens to India House which were subsequently sent to Kew and distributed therefrom to various herbaria, along with Hooker & Thomson's collection. He advised Government on Teak plantation in Burma and spent much time in reorganising the disorganised garden.

Falconer was succeeded by Thomas Thomson who retired in 1861. He explored Upper Gangetic Plain in 1839, Afghanistan in 1841,

Ghazni in 1842, Sutlej in 1843 and collected about 1000 species for the Flora of North Indian plains. In 1847 he was called upon to report on the geography and general conditions of the Kashmir-Tibet border. He collaborated with Hooker in his Eastern Himalayan tour in 1850 and distribution of their collections numbering 3,00,000. He was in Britain from 1851 to 1854 for working out his collections. He could not take interest in the living plants in the garden. He was invalidated out of India in 1861. Publication of *Flora Indica* by Hooker and Thomson was discontinued in 1861.

Thomas Anderson held the charge from 1861 to 1870. He was also Professor of Botany and the first Conservator of Forests for Bengal. He had to spend much of his energy on experimental cultivation of cinchona in the Sikkim Himalayas. It was first started at Sinchal, then shifted to Rongbee and finally the plantation was located in Mungpu.

C. B. Clarke, a brilliant mathematician, officiated as Superintendent for about 2 years (1869-71). In course of inspection of schools, he used to collect plant specimens. He collected in Khasi Hills, Sikkim, North West Himalayas, Kashmir and Karakoram. Geographical arrangement of the species-covers in the herbarium at Kew was largely due to Clarke's planning. He was interested in plant geography. He availed of leave for contributing to Hooker's *Flora of British India*, with the help of his extensive collection.

George King took charge of the garden in 1871 and continued upto 1897. He was also Professor of Botany in the Medical College and held the responsibility of Cinchona experiments in Darjeeling Himalayas. He collected plants from Central India, Kumaon, Sikkim, Malay Peninsula and had employed collectors in Nepal, Brahmaputra Valley, E. Himalayas, Khasi Hills, Cachar, Malay

Peninsula (H. Kunstler), Chumbi valley (Tibet) and Burma. King made remarkable contributions to Indian Botany, worked on materials for a Flora of Malay Peninsula and published taxonomic monographs on families of complexity. He initiated the publication of the *Annals of the garden* in 1887, established Botanical Survey of India in 1890, himself taking over as its Director, and published its first record in 1893. He contributed on several complex families and genera to Hooker's *Flora of British India*. In 1870, Lloyd Botanic Garden with an area of 40 acres was founded for cultivation of temperate plants at Darjeeling. King worked for its organisation and development.

The state of cinchona experiment at that time was one of almost despair. But he succeeded in efforts to supply the total alkaloids of *Cinchona* as a cheap malarial remedy.

Devastation wrought by cyclones in 1864 and 1870 deprived the garden of all shade. A large area was under coarse grass and large parts were still, as they always had been little better than swamps. King's handling of the reconstruction of the garden was masterly. He worked out the details of the reconstruction very meticulously and phased it for nine years, and in nine years it was done. The level of whole extent of the grounds was raised. The garden was divided into 25 divisions, 26 artificial lakes making one ninth of the whole surface were connected with each other by underground pipes and provision made for pumping water into or out of the system. All the roads were widened and improved. The herbarium building, residential buildings, conservatories, propagating house, tool and potting sheds, etc., were constructed at that time. King's designing of the garden was so admirable and business like, that he was asked to plan the new Zoological Garden and the gardens of official residences in Calcutta and in Darjeeling. The artist and orga-

niser in him played an active role in his achievement.

S. Kurz joined the garden in 1864 as the first Curator of the Herbarium and continued in that capacity until his retirement in 1877. He started work on the Flora of Bengal but soon switched over to the study of the Flora of Andaman and Burma. His Forest Flora of British Burma was written here (Kurz 1877).

David Prain worked as Curator of the Herbarium for 10 years from 1887 to 1897, took the charge of the garden in 1897, and became Director, Royal Botanic Gardens, Kew in 1906. He sketched out a geographical plan of the garden divisions. Prain cultivated a large number of economic plants, particularly ones the identity of which was doubtful, namely cultivated forms of wheat, mustard and others. He showed preference to economic Botany in his publications. He gained world wide recognition by his work on the genera *Pedicularis* and *Dioscorea* and regional floras.

A. T. Gage succeeded Prain in 1906 as the Superintendent and retired in 1923. A catalogue of non-herbaceous phanerogams cultivated in the garden goes to his credit. He worked on Euphorbiaceae and contributed to the Flora of Burma. During his leave in 1907 W. W. Smith who was then the Curator of the Herbarium, officiated as the Superintendent. C. C. Calder succeeded Gage in 1923 and retired in 1939. He worked on *Oxalis*, aquatic plants and vegetation pattern of India.

K. Biswas held the charge from 1937 to 1955. He took interest on the cultivation of tung oil plant in India. He worked on Diatoms and fresh water Algae, and wrote a large number of articles on various topics.

D. Chatterjee took over the charge in 1955. He improved recreational facilities of

the garden and worked on revision of certain genera and published many notes on new records, distribution etc. His work on endemism is outstanding. Of course it was worked out in the Royal Botanic Garden, Edinburgh and long before joining the Botanic Garden.

The garden contributed largely to the study of Indian plants in introduction and acclimatisation of economic, ornamental and other interesting plants. It led botanical science in India for many decades. The influence of the garden has altered horticulture in the country. Many of the Superintendents of the garden were Fellows of the Royal Society, London. King and Prain graced the post of Director of the Royal Botanic Gardens, Kew. W. W. Smith became the Regius Keeper of the Royal Botanic Garden and Professor of Botany, University of Edinburgh.

In the words of J. D. Hooker, this garden contributed more useful and ornamental tropical plants to the public and private gardens of the world than any other establishment before or since.

The transfer of the garden to the Botanical Survey of India in 1963, has opened up ample opportunity to reap the benefit of explorations conducted in the regions for introduction of plants in the garden.

There is enough scope to harness the present. It is not enough to get some seeds by exchange as and when available and grow them. We have to be selective and lay due stress on plants for conservation, economic exploitation, scientific utilization, and above all aesthetic inspiration. Taxonomic problems which cannot be effectively worked out in the herbarium or in the laboratory, but rather require cultivation of plants in the field are given priority in the research programme of the garden at present.

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