

THE CALCUTTA HERBARIUM : AN INTROSPECTION

D. B. DEB*

Central National Herbarium, Howrah

ABSTRACT

The Calcutta Herbarium (CAL) was initiated by William Roxburgh in 1793 with his own specimens of the Coromandel Coast. His studies drew attention of the world Scientists to tropical flora. Nathaniel Wallich involved the world authorities in determining the specimens accumulated in CAL and those stored in the India Museum, London. He was uncharitably blamed for destroying the herbarium. He wished the most complete set to be sent to Calcutta. But it was ultimately sent to Kew, know as K-W. Nine botanists who worked in India collaborated in writing out 80 families in Hooker's *Flora of British India*. Sir George King managed to get the garden transferred from the Imperial to the Provincial Government charge. Soon he was disillusioned. He managed some contingency funds from the Imperial Government in 1890 in the name of Botanical Survey of India. No post or office was created. Botanical Survey of India was reorganized in 1954. The topmost priority of working out the flora of India has never been given due attention. State and District Floras were given untimely priority. 50% of 220 Scientific personnel in B.S. I. if properly deployed could write the Flora of India in twelve years to be followed up with compilation therefrom of all the State and District Floras. The remaining 50% the scientific staff could be fruitfully utilized for other important branches of study like economic botany, ecology, cytotaxonomy etc., all aiming at the welfare of man.

INTRODUCTION

UNESCO's finding published by the World Bank says "though India has the largest pool of scientists and engineers in the world, they are not adequately engaged in research and development". The editor of the Statesman in June 1992 observed 'Indian mind given the right environment has established itself to be of highest grade'. I felt like presenting some facts in the form of an introspection on the activities of the herbarium with which I have been associated for the last 45 years.

ESTABLISHMENT OF THE CALCUTTA GARDEN AND THE HERBARIUM

The Court of Directors, East India Company, in a Dispatch, 16th March (Sic April) 1777 to Bengal declared "It is, at all times, our wish to consider the merits of intellectual pursuits outside their official duties, not only in the immediate branch or their stated duties of employments, but in every application that may enlarge the minds of our Servants in general to liberal and useful

enquiries" (Desmond Ray 1982 : 4). Officers of the Company were encouraged to devote themselves to intellectual pursuits of individual interest and opportunities. Their surgeons were encouraged to study the local flora and fauna, and were put in charge of botanical gardens where plants of potential economic use could be grown. Such a situation led to the foundation of the Asiatic Society of Bengal in 1784 for conducting research into the history, arts, sciences and literature of Asia, and was conducive to the establishment of the Botanic Garden, Calcutta, in 1786, at the initiative of Lt. Col. Robert Kyd, even before the proposal was forwarded to the authorities in London.

The Calcutta herbarium owes its origin to William Roxburgh who joined as Superintendent of the Botanic Garden, Calcutta in 1793. Earlier he served the East India Company for 8 years at Samalcot (Andhra Pradesh) where he studied the local plants with his mentor J. G. Koenig, a student of Carl Linnaeus. There he established a garden and grew useful plants for study. He described and illustrated 500 species of

* Present address. BB-109, Bidhannagar, Calcutta - 700064.

Coromandel plants, and brought to Calcutta his herbarium specimens and illustrations which constituted the nucleus of the Calcutta Herbarium (King, 1895; Mukerjee, 1959). Some of those are still extant at CAL amongst 55 of his specimens kept apart. These are a part of the 'residue' left by Wallich in 1828 in Calcutta. Roxburgh's specimens collected from the Cape of Good Hope in 1797 were presented by his daughter to Sir George King in 1877. Other specimens left by Roxburgh in CAL and those presented to the East India Company, London, were incorporated by Wallich in his herbarium, the list of which is known as *Wall. Cat.*

Roxburgh initiated Botanical Survey of India. He detailed his sons-William, Jhon and Bruce, and other staff for collection of plants from Madras, Sylhet, Chittagong, Nepal, Burma, Malaysia and Malacca. He had about 60 donors who sent plants or seeds to him for usefulness, beauty or peculiarity. He grew them in the garden and studied when in flower or fruit. All the plants of Scitamineae described up to that time were growing in the garden.

Roxburgh's method of study was unique. Large number of genera, the number of species belonging to deferent 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. He described about 3500 species of which 1510 were new (Roxburgh, 1814, 1820, 1824, 1832). His study was the main source of information on uses of plants before publication of Watt's "Dictionary of Economic Products of India."

Roxburgh's contributions made botanists of the world interested in Indian Botany. The garden rose to the peak of its glory as one of the most important centres of botanical research in the world. One of the greatest botanists of his time, he is rightly known as the Father of Indian Botany and also Linnaeus of India (King, 1899).

He did not give due importance to the herbarium specimens, and distributed them freely to various herbaria. While describing a new species sometimes he did not cite any specimen. As for an example in describing *Oldenlandia ramosa* Roxb. (1820 : 445) he says 'plant collected from Pegu and cultivated in the Botanic Garden, Calcutta, where it blossomed and ripened seeds during rainy and early cold season'. He did not cite any herbarium specimen. Roxb. Icon. No. 1946 at CAL agrees fully with the description, and leaves no doubt that he had at least one specimen on the basis of which it was drawn. His coloured plates grew to 2583 based on the same number of specimens, 300 of which were published in '*Plants of the Coromandel Coast*' (Roxburgh, 1795-1818) and another 400 in '*Wight's Icones*' (Wight, 1830).

ENRICHMENT AND DEPLETION OF THE HERBARIUM

Nathaniel Wallich was the Superintendent of the Garden for 30 years (1817-1846). He undertook extensive survey of Indian subcontinent : Nepal (1820), Western Himalayas, Upper Gangetic Plains (1826), Sylhet, Chittagong, Meghalaya, Burma (1826), Brahmaputra valley (1836), Penang, Tenasserim., Singapore, Malacca, Martaban (1822), etc. Besides he had collectors to send him plants from Nepal, Kumaon, Chittagong, Sylhet, Meghalaya, South India, Tenasserim, Penang and Sumatra.

Wallich used to send plants and seeds to Edinburgh and other European gardens and distinguished botanist like (1) J. E. Smith, (2) J. Banks, (3) A. B. Lambert, (4) W. Roscoe and others from 1819 onwards and freely and frequently exchanged specimens with principal herbaria.

On returning from the Burmese expedition in 1827 Wallich decided to close his collection, as his health was deteriorating. The herbarium contained about 8000 species. He proceeded on leave to London with all the specimens accumulated in the herbarium.

He hired a working place at Fife Street and brought in all the specimens housed in the India Museum, London.

Specimens included in Wallichian Herbarium, which were not collected by Wallich himself are named below with the places of their collections.

1. William Roxburgh : Coromandel Coast (collections left at CAL).

2. Robert Blinkworth : Srinagar, Kumaon, Garhwal, Sermore, Kedarnath and Badrinath.

3. Buchanan Hamilton (later, Francis) : Nepal, Madhya Pradesh, Karnataka (Mysore), Bengal, Assam, Burma, etc.

4. M. R. Smith : Sylhet, Khasia & Jaintia Hills.

5. Francis de Silva : Sylhet, Khasi & Jaintia Hills.

6. Henry Bruce : Chittagong, Sylhet.

7. William Gomez : Lower Burma - Tavoy & Tenasserim.

8. G. Porter : Penang.

9. P. J. Noton : Calicut, Nilgiri Hills, etc.

10. H. Hawtayne : Calicut, Nilgiri Hills, etc.

11. J. F. Royle : Western Himalayas, Kashmir.

12. L. T. Leschenault : Nilgiri Hills.

13. T. S. B. Raffles : Sumatra, Penang, Singapore.

14. W. Jack : Sumatra.

15. A. Mahmood : Chittagong, Prome.

16. Lady Amherst : Simla.

17. E. Gardner : Nepal.

18. R. Stuart : Nepal.

19. R. Colquhoun : Kumaon.

20. W. Carey : Bengal.

21. T. Hardwicke : N. W. India.

22. W. Moorcroft : Kabul, Kashmir, Ladakh.

23. G. Govan : Western Himalayas, Garhwal, Saharanpur.

24. W. S. Webb : Western Himalayas.

25. Gerard brothers : Gerard, A., J. G. & P. : Western Himalayas.

26. B. Heyne : South India.

27. J. G. Klein : Madras, Travancore.

28. J. G. Koenig : South India.

29. J. P. Rottler : Madras and Carnatic.

30. P. Russell : Madras.

31. R. Wight : South India.

32. C. Belanger : Armenia, Persia.

33. T. Horsfield : Java.

34. D. Scott : Manipur, Malacca.

35. Beaumont Lady Diana : Malacca.

36. Cultivated plants in Calcutta and 24 other gardens.

It became a centre of attraction for the rich collections of eastern flora.

Scientists who helped Wallich in sorting out and identifying his specimens are named below with the names of families concerned.

1. A. P. de Candolle, Geneva :

1. Bigoniaceae, 2. Campanulaceae, 3. Myrsinaceae & 4. Urticaceae. (for *Prodromus monographs*).

2. A. Casimir P. de Candolle, Geneva : 5. Meliaceae (for *Prodromus monographs*).

3. K. Meisner, Switzerland : 6. Polygonaceae, 7. Proteaceae, 8. Lauraceae, 9. Hernandaceae, 10. Thymelaeaceae.

4. J. Cambassès, Paris : 11. Hypocrataceae, 12. Sapindaceae, 13. Ternstroemiaceae.

5. J. D. Choisy, Geneva : 14. Guttiferae, 15. Hypericaceae, 16. Convolvulaceae.

6. C. G. D. Nees, Breslau, now Wroclau in Poland : 17. Lauraceae, 18. Acanthaceae, 19. Solanaceae, 20. Cyperaceae.

7. J. G. C. Lehman, Hamburg : 21. Boraginaceae, 22. Primulaceae (partly), 23. Rosaceae (*Potentilla*) also Hepaticae.

8. J. E. Duby, Geneva : 24. Primulaceae (partly).

9. A. T. Brongniart, Paris : 25. Celastraceae, 26. Rhamnaceae.

10. C. F. P. van Martius, Munich :
27. Eriocaulaceae, 28. Xyridaceae,
29. Palms, 30. Araceae, 31.
Hydrocharitaceae, 32. Scitamineae.
11. C. G. Kunth, Berlin : 33. Gramineae.
12. F. A. W. Miquel, Utrecht : 34. Piperaceae.
13. W. S. J. G. Besser, Poland : 35. Araceae
(*Artimisia*).
14. A. H. L. de Jussieu, Paris :
36. Malphigiaceae.
15. John Miers, London : 37. Menispermaceae.
16. N. J. Anderson, Stockholm : 38. Salicaceae.
17. J. Lindley, Cambridge : 39. Orchidaceae,
40. Rosaceae, 41. Fagaceae, 42. Oleaceae,
etc.
18. R. Graham, Edinburgh : 43. Leguminosae.
19. R. Brown, British Museum : 44. Annonaceae,
45. Capparaceae, 46. Rubiaceae (partly),
47. Gramineae (partly), 48.
Melastomataceae (partly).
20. D. Don, Edinburgh : 49. Xyridaceae,
50. Liliaceae (partly), 51. Juncaceae,
52. Gentianaceae.
21. R. V. Greville, Edinburgh : Cryptogams :
Algae, Ferns.
22. A. H. Haworth, London : 53. Portulacaceae,
54. Crassulaceae & other succulents.
23. W. Hooker, Kew : Ferns.
24. J. D. Hooker, Kew : 55. Crassulaceae.
25. A. B. Lambert, London : 56. Coniferae.
26. J. D. Prescott : 57. Cyperaceae.
27. William Roscoe, Liverpool :
58. : Scitamineae.
28. G. Bentham, London : 59. Anacardiaceae,
60. Rubiaceae (partly), Euphorbiaceae,
62. Palmae, 63. Gramineae.

From the above it is evident that the specimens in the Wallichian Herbarium were identified by 28 experts of the time in respect of 63 families of spermatophyta, the remaining ones were identified by Wallich himself. After identification, the species were arranged family and genus-wise, in Bentham & Hooker's (1872)

system. All the specimens of a species were given one number only. Specimens collected by different persons from different places were given sub-numbers A, B, C, etc., up to no. 2221 and then under the remaining ones sub-numbers 1, 2, 3, etc. were used.

Before Wallich reached London in 1828, his friend and well-wisher J. E. Smith who purchased the Linnean Herbarium and was the founder President of the Linnean Society of London from 1784 to 1828, died. His another collaborator, William Roscoe who was working on Scitamineae died in 1831. These must have created set-back in his work. However, in October 1832 he requested the Council of the Linnean Society of transmit the best set (the most complete set) to Calcutta. His request was not honoured. Sir William Thiselton-Dyer, Director, Royal Botanic Garden, Kew, in 1905, tried to get this herbarium, arguing that it had only been deposited with the Linnean Society, and legally it was still the property of India office, the successor to the East India Company. At that time Linnean Society refused to accept the validity of this claim but in 1913, compelled by acute shortage of space gladly transferred not only the Wallichian Herbarium but also other South and South East Asian collections to Kew, now known as K-W. Smith & Parsons (IDC microfiche, 1971) listed about 700 specimens non-existent in K-W, while about 300 supplementary specimens are included in that set. It shows that no set was complete.

The International Code of Botanical Nomenclature was not instituted at that time. The earlier botanists did not mark out any sheet as the type nor they were interested in maintaining it. Sometimes they would send it out to somebody and keep another specimen considering it a better one. Sometimes they preferred illustrations. Wallich while sorting out the specimens did not give any importance to the type specimens, nor did he keep all the type specimens in any particular set. All the specimens of a collector from a place having been

given the same sub-number in *Wall. Cat.* have the same claim to be selected as the lactotype as per nomenclatural code.

Wallich was authorised to distribute duplicates from his collections which represented the labours of all his predecessors in India. Altogether 64 universities, museums, societies and individuals benefitted therefrom (Desmond Ray, 1982).

He was well-known as 'a man of warm affection, of ready wit and of pleasing manners, a most amusing companion, steady in his attachment and indefatigable in his exertions for the advancement of his favourite science' Griffith (24) and McClelland (29) were ill-matched with Wallich, who at 48 was old for his years'' developed bitterness as members of Assam Tea Expedition, the two youngmen always speaking against Wallich (Burkill, 1965 : 59). J. D. Hooker described Wallich's distribution of his collections as "the most valuable contribution of its kind ever made to Science'' He himself followed Wallich in distributing specimens from Kew.

FOUNDATION OF THE PRESENT HERBARIUM

The present herbarium owes its origin to William Griffith, who was the Superintendent of the Garden from December 1842 to August 1844, when Wallich was on leave. Griffith organized the herbarium with (1) the residue left by Wallich in 1828, (2) specimens remained in the seed house, (3) specimens in the garden herbarium and (4) Australian and Indian plants collected by Captain Vicary which were preserved in the ground floor of the Superintendent's quarters.

He arranged the specimens in two divisions :

I. A general herbarium named as Public Herbarium and II. Local herbarium comprising (1) Eastern Himalayas, (2) North-West Himalayas, (3) North-West Frontier, (4) Peninsular India, (5) Bengal, (6) Assam and (7) Burma. The local herbarium was formed to illustrate Botanical Geography and vegetable statistics of each region. It helps in quick identification by comparison. It lessens the burden

of handling the specimens of the general herbarium and thereby lengthens the quality and life of the specimens.

In the general herbarium the following were incorporated :

(1) Rottler's specimens from Carnatic, which Wallich brought from Denmark in 1832 on his way back to India. (2) Griffith's own collections, (3) Aitchison's Kurram valley plants and Hooker's set of Afghanistan Expedition plants.

He further arranged return from London of illustrations of Indian plants sent away by Hamilton and Wallich. He willed all his herbarium specimens, drawings, spirit preserved materials and manuscripts to the East India Company. McClelland in 1846 sorted out Griffith's collections of 9000 species from Assam, Bengal, Khasi Hills, Burma, Bhutan, Afghanistan and Malacca for incorporation in the herbarium and published his manuscripts posthumously (Griffith, 1847-54, 1850).

Griffith sorted out the bottles containing flowers and fruits preserved in spirit, and arranged the library holding and published a list of books in the library along with the annual report for the year 1843.

Thomas Thomson, a friend of J. D. Hooker was the Superintendent of the Garden from 1856 to 1861. He explored the Gengetic Plains (1839), Afghanistan (1841), Ghazni (1842), Kashmir-Tibet Border (1847) and Sutlej (1848), besides others. He accompanied J. D. Hooker in 1848 in the Eastern Himalayas, Sikkim (3500 spp.), North-East India (1000 spp.), Khasi and Jaintia Hills (3000 spp.), Sylhet and Chittagong, they left for England in February 1851 with 150000 specimens. Thomson in 1854 brought with him duplicate specimens of his and of Wallich, and in 1855 received from Kew duplicates of Falconer, J. D. Hooker, T. Thomson, R. Wight, Wallich etc. He was invalidated in 1861, when publication of *Flora Indica* by Hooker & Thomson discontinued. Hooker & Thomson's collection of Eastern Indian plants was received in the

herbarium in 1867, along, with a large number of foreign specimens mostly American.

Sulpiz Kurz, a native of Munich joined as the first Curator of the Herbarium in 1864. He started work on the Flora of Bengal, but had to change over to the study of the Flora of Andamans and Burma. He presented all his specimens to the herbarium. It includes some Malayan and good many European plants. He went on leave in November 1876 and died on 9.2.1877 at Panang. His *Flora of British Burma* was published in 1877.

Collaborators in J. D. Hooker's Flora of British India, who earlier explored and studied the Flora of India while working in India.

1. C. B. Clarke : 1. Saxifragaceae,
2. Crassulaceae, 3. Droseraceae,
4. Hamamelidaceae, 5. Haloragaceae,
6. Rhizophoraceae, 7. Combretaceae,
8. Myrtaceae-Barringtoniaceae,
9. Melastomataceae, 10. Lythraceae,
11. Onagraceae, 12. Samydaceae,
13. Cucurbitaceae, 14. Begoniaceae,
15. Datisceae, 16. Cactaceae,
17. Aizoaceae (Ficoidaceae), 18. Apiaceae
(Umbelliferae), 19. Araliaceae,
20. Cornaceae, 21. Caprifoliaceae,
22. Stylidiaceae, 23. Goodeniaceae,
24. Campanulaceae, 25. Vacciniaceae,
26. Ericaceae, 27. Monotropaceae,
28. Epacridaceae, 29. Diapensiaceae,
30. Plumbaginaceae, 31. Primulaceae,
32. Myrsinaceae, 33. Sapotaceae,
34. Ebenaceae, 35. Styraceae,
36. Symplocaceae, 37. Oleaceae,
38. Salvadoraceae, 39. Loganiaceae,
40. Gentianaceae, 41. Polemoniaceae,
42. Boraginaceae, 43. Convolvulaceae,
44. Solanaceae, 45. Lentibulariaceae,
46. Gesneriaceae, 47. Bignoniaceae,
48. Acanthaceae, 49. Verbenaceae,
50. Cyperaceae.
2. J. F. Duthie : 51. Myrtaceae (excl.
Barringtoniaceae).

3. J. S. Gamble : 52. Gramineae-Bambuseae.

4. T. Thomson (& J. D. Hooker) :
53. Ranunculaceae, 54. Dilleniaceae,
55. Magnoliaceae, 56. Annonaceae,
57. Menispermaceae, 58. Berberidaceae,
59. Nymphaeaceae, 60. Papaveraceae,
61. Capparaceae, 62. Resedaceae,
63. Violaceae, 64. Bixaceae,
65. Pittosporaceae.

5. T. Anderson (& J. D. Hooker):
66. Brassicaceae, 67. Capparaceae,
68. Guttiferaceae (partly).

6. M. P. Edgeworth (& J. D. Hooker) :
69. Caryophyllaceae, 70. Zygophyllaceae,
71. Geraniaceae (excl. Balsamineae).

7. Maxwell T. Masters : 72. Malvaceae,
73. Sterculiaceae, 74. Tiliaceae,
75. Olacaceae, 76. Passifloraceae.

8. M. L. Lawson : 77. Celastraceae,
78. Rhamnaceae, 79. Vitaceae.

9. G. King : 80. Urticaceae- *Ficus* and
Artocarpus.

Sir George King was the Superintendent of the Garden for 26 years (1871-1897). He explored Central India, Kumaon, Sikkim, and Malay Peninsula. Besides he had collectors in Nepal, Chumbi valley (Tibet), Eastern Himalayas, Brahmaputra Valley, Meghalaya, Cachar, Burma and Malay Peninsula to send him specimens. He initiated Annals of the Botanic Garden, Calcutta, in 1887, and Records of the Botanical Survey of India in 1893.

On facing difficulties in getting funds from the Imperial Government, George King succeeded in transferring the Garden as a Provincial subject. Soon he was disillusioned. He joined hands with M. A. Lawson (Madras), J. F. Duthie (Saharanpur), and T. Cooke (Pune) and managed to get a contingency grant in 1890 for exploration in the name of Botanical Survey of India. No post or office was created. He was allowed the official designation, Director, Botanical Survey of India, in a purely honorary capacity and the other 3

officers of the provincial Govts., were allowed to use the designation, 'Regional Director' in a honorary capacity. The Director was initially sanctioned a grant of Rs. 1000/- for exploration of Assam and Burma, and the Regional Directors Rs. 500/- each for exploration. It appears that they did not receive the sanctioned amount. The Regional Directors were asked to submit reports to the Imperial Government through the Hony. Director. With the retirement of Duthie, the link with Saharanpur was soon cut off. Madras and Bombay Govts., entrusted their botanical survey with their Economic Botanists. Such a situation with honorary designation and without creation of any post cannot be treated as the establishment of Botanical Survey of India. In 1902 on review of the working of different departments, Imperial Government merged the office of the Reporter on Economic Products of India with that of the Curator, Industrial Section, Indian Museum. This was given effect from January 1911. Annual grant for exploration was withdrawn and ultimately coordination of plant exploration work ceased. A post of Systematic Assistant in Class II was created and attached to the Herbarium under the Superintendent of the Botanic Garden as Ex-officio Director, Botanical Survey of India. Since 1916 Superintendent of the Garden had to devote almost the full time to Cinchona plantation. From 13th October 1937 duties of the Director, Botanical Survey of India, were divided amongst Curator, Industrial Section, Indian Museum, Quininologist and the Superintendent, Botanic Garden.

In 1883 the specimens in the herbarium were estimated to be about 50,000 which rose to 10,00,000 in 1897, when the herbarium received many specimens and duplicates of new collections distributed by many herbaria in Europe, the Gifts being adequately reciprocated.

THE CENTRAL NATIONAL HERBARIUM

A special committee appointed by the Botany Section of Indian Science Congress Association at its Silver Jubilee Session, held in Calcutta on

9th January 1938, had unanimously resolved that the Sibpur Herbarium was the most suitable for being developed into the National Herbarium for India. The late Sir Arthur Hill, the then Director, Royal Botanic Gardens, Kew, was one of the signatories to that resolution. On taking over the herbarium from the Government of West Bengal on 1st April 1957 with the Curator and other staff, Govt. of India named it Central National Herbarium (CNH).

Panigrahi (1977) estimated the specimens in the herbarium as 12,01,450, Type specimens over 10,000, Wallichian specimens over 12,000 and photographs of types 12,000. He further reported that from 1956 to 1979, 250,000 Field numbers were collected by Botanical Survey of India of which 36000 duplicates were received in Central National Herbarium for incorporation. Jain (1983) reported the Field numbers collected up to 1983 as 3,00,000. According to the original order of Director, Botanical Survey of India, at least 6 specimens under one Field number were to be collected : 2 for the local herbarium, 2 for CNH and 2 for exchange. If that policy were followed CNH should have received 6,00,000 specimens up to 1983, of which 36000 were received. It is only 6% of the desired number.

CHANGE IN THE ARRANGEMENT OF THE HERBARIUM

In 1976 authorities decided to dismantle the local sections of the herbarium maintained since 1842 and to incorporate those specimens in the general herbarium. Most of the scientific and technical staff working in different offices were asked to do this job. They were asked to see that specimens not bearing any specific name should not be incorporated. In early days very often workers used to sort out all the specimens of a species collected from the same place, wrote the name on one specimen while keeping the remaining ones below it without writing the name. Specimens which could not be identified up to the species were being kept below the allied species. Most of the staff engaged in incorporation work

were not acquainted with the practice of the herbarium. Even those who knew it remained silent in apprehension of incurring displeasure of authorities and followed the instruction mechanically, keeping those specimens away. As a consequence thousands of identified specimens were removed and kept apart as unidentified, even Blume's specimens were not given a better treatment.

SPIRIT AND CARPOLOGICAL COLLECTIONS

Linnean Society of London while transferring the Wallichian Herbarium to Kew in 1913 also presented Wallich's collections of 172 bottles of fruits and flowers preserved in spirit, along with others. This evidently shows that spirit and carpological collections were preserved since 1817, if not earlier also. Whatever were left in the Garden, William Griffith in 1842 sorted out the spirit collections. Those were being maintained as a museum along with abnormal specimens and large carpological specimens. In the fifties it was in the Seed House. When the herbarium was taken over by the Government of India, the museum was not probably taken into account, and remained there until the Garden dispensary was shifted to that building. What happened with those specimens preserved in varying sized jars is not known. A Carpological Section was initiated in the garden in the 4th plan period with one officer and several other staff. It worked for several years.

CARD INDEX

David Prain in 1905 started preparation of Index Cards of families, genera and species. Also Index Cards of new species which were published by Herbier Bossier in Switzerland in the form of oblong cards were converted into card catalogues. When this was discontinued these could not be traced. Dr. S. K. Mukerjee started publication of correct nomenclature with synonyms in the departmental bulletin with some of his associates. Soon it was discontinued. Nomenclatural cards are essential for proper upkeep of the

herbarium. A Documentation Officer was appointed by the Department. The Officer recently retired from service. Impact of having a Documentation Section could not be felt.

PRESERVATION OF SPECIMENS

Situated in a moist humid environment preservation of specimens against insect and fungus infection deserves topmost consideration. The time-old method of poisoning with saturated solution of Mercuric Chloride served the purpose in earlier days, use of Paradichlorobenzene as a substitute seems to raise some problem. Fumigation with Aluminium phosphide is also tried. Now that air-conditioning of the herbarium is expected to work with immediate effect, the best method with long range effect may be found out on conducting studies with different methods, and the most suitable one adopted.

Library is the most important part of the herbarium. There is enough scope for improving the Library service system and lessen the time consuming burden of research workers.

INFRASTRUCTURE OF THE HERBARIUM

Historically valuable specimens in a herbarium are regarded as a part of general heritage of plant science, rather than a private possession of an institution regardless of the institutional legal status. Anybody working in a herbarium must follow herbarium ethics. Up to the time of transfer of the herbarium from the State Government any employee working in it had to commit to memory the family numbers arranged in the Bentham and Hooker's system and equip oneself for doing the work assigned. Nature of work in the herbarium requires dedicated service in each and every post, however small it may be.

ORGANIZATION OF BOTANICAL SURVEY OF INDIA

As already discussed, Botanical Survey of India was constituted on 1st April 1954, on the basis of a proposal submitted by Dr. E. K. Janaki Ammal as an officer on special duty, for study of

plants for the welfare of man. The proposal included, *inter-alia*, (1) a Central Directorate for control of the Department, (2) a Central Botanical Laboratory for study of living plants in relation to its botany and utility to the nation, (3) establishment of 4 Regional Circles, (4) A Central National Herbarium and (5) maintenance of a Botanical Museum.

The Central Botanical Laboratory was created under a Director in the same scale of pay as that of Director of the Department and a second post in the laboratory was created in the rank of Regional Botanists, Keeper, Central National Herbarium, and the Curator, Industrial Section, Indian Museum. The Central National Herbarium, the most important organ of the Survey, taken over from the Govt. of West Bengal was relegated to a secondary status. The Industrial Section, the Botanical Museum with its economic herbarium, Watt's Ledgers and the rich Library was also not given the status it deserved. Botanists in the Regional Circles and the Central National Herbarium were given a scale of pay Rs. 200-650/- while the Class II Officers in general, under the Govt. of India at that time were in the pay scale of Rs. 350-800/-.

At that time there were 3 outstanding Systematic Botanists in India, namely (1) Dr. D. Chatterjee who became the Superintendent of the Botanic Garden, (2) Dr. H. Santapau who was subsequently appointed Chief Botanist and (3) Dr. S. K. Mukerjee who was seniormost of them (in getting the Ph. D. Degree and in appointment at the initial stage) was Curator of the Herbarium since 1939 was placed in the pay scale of Botanist, Central Botanical Laboratory and Regional Botanists and was treated as juniormost Officer in the rank.

No estimate of scientific output nor any evaluation of the performance was ever made in proper perspective. The consequence is obvious. While the Industrial Section is the economic wing of the Department, an Economic Botanist was appointed in the Headquarters Organisation asking the officers to work on ethnobotany, that too

only to collect information on uses of plants by tribal people, not the study of ethnobotany at the scientific level.

Ecology section started before the country thought of environmental study, devoted all energy to coastal ecology. Plant Anatomy Section, Carpology Section, Microbiology Section etc., did not function for long. More Circles and Stations were opened with the creation of many more posts. 4 posts were created in the name of Flora Cell, for revisionary studies under the Headquarters, asking the officers to work in the herbarium.

In the original plan Government of India wished *inter alia* to build up the essential infrastructure for research in the Flora of India, search for economic plants from India and other countries, and exploration parties to be sent to South America, Africa, Madagascar and Indonesia, and to complete writing the Flora of India to celebrate the centenary of Hooker's *Flora of British India* (1872-1897).

The Scientific Programme Implementation and Evaluation Committee (SPIEC) in March 1976 redefined the aims and objectives of the department as follows : The Botanical Survey of India must (1) aim at taxonomic studies, and entire scientific staff must be utilized for planning and execution of the Flora of India Project. Everything else must be taken up as a complement of the Flora work, (2) Encourage research and monographic studies in individual taxa of Indian plants by Scientists working both inside and outside the organisation with collections available at hand. An ethnobotanical study of the Flora of tribal area should also receive adequate emphasis. However, all these work must be provided on the Flora of India Project, (3) Development of the Botanical Section of Indian Museum for study and display of economic plants.

FLORA OF INDIA

The topmost priority in the activities of the department was to publish the Flora of India, on

the basis of taxonomic study of genera. Initially Botanical Survey of India took up botanical exploration, field study and collection of specimens. At that time an order was issued from the Head Office that an officer should undertake at-least 3 exploration tours a year. Before submitting proposal for the 3rd tour he must complete determination of the specimens collected in the first tour. Three seasonal tours should be conducted in an area in a year and it should continue for 3 years so that all the species available there are collected and characteristics of the vegetation concerned is brought out. Basak's (1983) analysis of the exploration work done up to 1983 indicate large extent of work still remains to be done.

While working on the taxonomic revision of genera it is noted that many interesting species are not represented in Indian herbaria or not collected for the second time.

In 1965 at the advice of the Ministry, some officers were assigned families of their choice to be worked out for the Flora of India. Director issued a circular that workers involved should be given all facilities and assistance required.

Dr. S. K. Mukerjee soon after taking over as Director and on discussion with the senior officers, decided to work out the Flora of India and assigned families of Hooker's Flora of British India Vol. I to some workers. Dr. S. K. Jain in 1978 finalised the format and started publishing fascicles of families, tribes and genera as and when the manuscript was ready. Dr. M. P. Nayar on taking over as Director, changed the policy and decided to publish both fascicles several families and volumes.

Basak (*l. c.*) estimated that scientific and technical staff with B. Sc. and above degree in Botany is 240. If 50% of this number is i.e., 120 workers is assigned to Flora of India work, they are able to work out (@10 species a year) 1200 species a year. In 10 years they work out 12000 of 13000 species of angiosperms in India. Thus in 12 years Flora of India should have been published. The remaining 50% of staff could be utilized for other important branches of study like

economic botany, ecology, cytotaxonomy, plant chemistry etc., aiming at the welfare of man. Over the years the number of Scientific staff has tremendously reduced due to retirement on superannuation.

Once a family is worked out for India, it is also worked out for every State and District wherever any species of that family grows. It requires sorting out the manuscript without any more scientific work. It must be noted here, that State and District Floras may be compiled from the National Flora.

It is sufficiently clear from the above analysis that in Botanical Survey of India scientists are not adequately engaged in research and development. It supports the findings of the World Bank.

REFERENCES

- ANDERSON, T. A few notes on the foundation of the Botanic Garden, Calcutta. *Journ. Agric. Hort. Soc. India* N. S. 1 : 169-184. 1869.
- BASAK, R. K. Botanical Survey of India. An account of its establishment, development and activities. Botanical Survey of India, Howrah. 1983.
- BENTHAM, G. AND J. D. HOOKER. *Genera Plantarum* 3 Vols. William Pamplin, Lorell Reeve & Co. London. 1862-1883.
- BISWAS, K. The Royal Botanic Garden, Calcutta. *Sci. & Cult.* 6 : 26-33. 1940.
- 150th Anniversary Volume, Royal Botanic Garden, Calcutta. 2 - 12. Govt. of Bengal. 1943.
- The original correspondence of Sir Joseph Banks relating to the foundation of the Royal Botanic Garden, Calcutta. 1-62. *Asiat. Soc. Bengal.* Calcutta.
- BURKILL, I. H. Chapters on the History of Botany in India. Manager of Publications, New Delhi, 1965.
- CLARKE, C. B. Collector's Number *J. Bot.* 31 : 135-138. 1893.
- CHATTERJEE, D. Royal Botanic Gardens, Kew (Kew & India). *Sci. & Cult.* 12 : 414-418. 1947.
- National Herbarium for India. *Ibid.* 13 : 328-330. 1948.
- DE CANDOLLE, A. L. P. P. On the botany of India and the facilities afforded for its investigation by the East India Company. *New Phil. Journ. Edinburgh.* 9 : 123-129. 1830.
- A. P. A. L. P. P. & ANNE. C. PYRAMUS. *Prodromus Systematis Naturalis. Regni Vegetabilis* 17 Vols. Treuttel & Wirtz, Fortin Mason et Sec. V. Mason, G. Mason, Paris. 1828-1873.

- DeCANDOLLE, A.L.P.P. ROGER & A. R. SMITH. Nathaniel Wallich, M. D., Ph. D., F. R. S., FLS, FRGS & the Herbarium of the honourable East India Company & Their relation to the de Candolles of Geneva and the Great Prodromus. *Bot. J. Linn. Soc.* 83 : 325-348. 1981.
- DEB, D. B. The Indian Botanic Garden, *Bull. Bot. Surv. India* 19 : 263-265. 1977 (1979).
- DESMOND RAY. The India Museum 1801-1879. Her Majesty's Stationery Office, London. 1982.
- DON D. Prodromus Florae Nepalensis. *J. Gale*, London. 1825.
- GHOSH, A. K. A note on the National Herbarium for India. *Sci. & Cult.* 13 : 73-75. 1948.
- GRIFFITH, G. Report on the Tea Plant of Upper Assam. *Trans. Agric. Hot. Soc. India* 5 : 94-180. 1838.
- Report on the Hon'ble Company's Botanic Garden, Calcutta, Military Orphen Press. 1843.
- HOOKE, J. D. The Flora of British India. 7 Vols. L. Reeve & Co. London. 1872-1897.
- AND T. THOMSON. Flora Indica : An Introductory Essay. W. Pamplin, London, 1855.
- JAIN, S. K. Botanical Survey of India : 1958-1983. *Bull. Bot. Surv. India* 25 : 252-269. 1983.
- *JANAKI AMMAL, E. K. The scope and functions of the reorganized Botanical Survey of India. *Sci. & Cult.* 20 : 275-286. 1954.
- *KING, G. A brief memoir of William Roxburgh, Author of the Flora Indica. *Ann. Roy. Bot. Gard. Calcutta* 5 : 1-9. 1895.
- The Early History of Indian Botany. *Journ. Bot.* 37 : 454-463.
- McCLELLAND, J. Report on the Botanic Garden of Calcutta by Dr. Wallich, Superintendent, 1836-1840 (Critical review of) *Calcutta J. Nat. Hist.* 2 : 288-294. 1841.
- MUKERJEE, S. K. Central National Herbarium, *Bull. Bot. Surv. India.* 1 : 30-32. 1959.
- NAYAR, M. P. AND J. N. VOHRA. Twenty five years of Research : Laboratories and Head Quarters of B. S. I. *Ibid.* 25 : 268-278. 1983.
- PANIGRAHI, G. Central National Herbarium (CAL) : Past Present and Perspective for the future. *Ibid.* 19 : 212-224. 1977 (1979).
- ROXBURGH, W. (ed. W. Carey & N. Wallich) Flora Indica 2 vols. 1820 & 1824.
- (ed. W. Carey). Flora Indica 3 Vols. 1832. Thacker & Co. Calcutta & Parbury Allen & Co. London.
- SMITH, A. R. AND T. J. PARSONS. The Wallichian Herbarium in 17 Microfiches of the Herbarium of the East India Company (K-W). Prefatory notes, collections, incorporated herbaria, cultivated materials lists etc. International Documentation Comp. AG. Zug, Switzerland, 1971.
- STEARNS, W. T. David Don's Prodromus Florae Nepalensis. *J. Arn. Arb.* 26 : 168. 1939.
- THOTHATHRI, K. The Central National Herbarium. *Bull. Bot. Surv. India* 25 : 279-289. 1983.
- AND R. K. BASAK. Nathaniel Wallich (1786-1854) and his contributions to the Botany of India and neighbouring countries. *Ibid.* 31 : 1-27. 1989 (1992).
- WATT, G. Dictionary of the Economic Products of India.
- WIGHT, W. Illustrations of Indian Botany, Principally of the southern parts of the Peninsula, Plates 1-19, & 21-32. Curll. & Bell., Glassgow. 1831.
- Icones Plantarum Indiae Orientalis. 1838-1854.