

## FLORISTIC STUDIES IN NORTH-EASTERN INDIA (OLD ASSAM REGION)\*

A. S. RAO

*Botanical Survey of India, Howrah*

The North Eastern Region of India (old Assam) wedged between Tibet, China and Burma, with the broad Brahmaputra river valley dividing off the lofty E. Himalayan Ranges on its north and the more or less plateau like Assam Ranges in the south, has a varied topography, climate and flora that continues to beckon scores of botanists, plant explorers and garden hobbyists, to participate in the exploration, collection and unravelling of its tascinating floristic riches.

The earliest to observe and write of the plants of Assam was F. Buchanan-Hamilton (1820). W. Roxburgh (1820, 1832) who received off and on, plants, mostly of ornamental interest for introduction to the Botanic Garden, Sibpur, and mostly from the Khasi Hills, attributed, their origin to the 'Sylhet mountains', little knowing that the area was a vast lowland, an error that was to be corrected by J. D. Hooker much later. An event that triggered off a more or less planned exploration of this area was the chance reference for identification, of a flowering twig, picked up somewhere in the 'Singpho country', to N. Wallich, then Superintendent of the Botanic Garden. He recognised it as the 'wild tea',

and the East India Company organised the 'Assam Tea Delegation' to establish the occurrence of the plant in the Assam wilds. W. Robinson (1841) in his 'Descriptive account of Assam' has a chapter on the flora, as well as the story of wild Tea discovery, in Assam. The Assam Tea delegation formed of the Triumvirate of Wallich, Griffith and McClelland, forms the first land mark on an organised effort on the study of floristics in the North Eastern Region. The large plant collection and voluminous writings of the former two (Wallich 1832 & Griffith, 1848) remain an essential source material in our floristic knowledge of this area. The second land mark is that of J. D. Hooker & T. Thomson who principally collected in the twin, Khasi & Jaintia hills of present Meghalaya. Hooker (1854) was wonderstruck by the rich, diverse flora, 'having collected more than 2000 different kinds of flowering plants alone, not to speak of innumerable ferns and fern-allies in the vicinity of Cherrapunji'. Hooker had the sponsorship of Lord Dalhousie and his collection was aided by an army of local plant collectors. Hooker's carefully recorded observations, coming as it does from a professional botanist, with a personal knowledge of the flora in several parts of the world, is of considerable value to us in comparing notes of the present 'status of the flora' in these spots, a point of crucial importance in the current context of conser-

\*The present political units in the area are : Arunachal Pradesh (former Balipada & Sadiya Frontier tracts, subsequently named North Eastern Frontier Agency or NEFA); Nagaland, Manipur, Meghalaya, Mizoram, Tripura and (residuary) Assam.

vation. At about this time the famous Garden Firm of Veitch had also a plant collector, Thomas Lobb gathering plants of interest to English Gardens. Several other amateur plant collectors contributed off and on plants of interest to the botanic garden and the Herbarium at Sibpur. Burkill (1965) has chronicled all these in considerable detail and the index in his work, is a virtual Roll call of Honour of pioneer plant explorers. The plant collections eventually found their way to London and are now principally in the Kew Herbarium, with an appreciable number of duplicates in the present Calcutta National Herbarium.

The first person to begin a systematic collection of Assam plants and to preserve them at Shillong, was Gustav Mann, the first Conservator of Forests for Assam. During his tenure from 1870 to 1885, he sent duplicate plants to Dehra Dun, to his Chief D. Brandis, then Inspector General of Forests, gathering material for his 'Indian Trees', and kept the identified collection (mounted on writing paper only) in his office room. Subsequently, with the enthusiastic encouragements of Sir Archdale Earle, then Chief Commissioner of Assam, U. N. Kanjilal, began to vigorously add to the collections with a view to eventually bring out a Flora of Assam. He had been inspired and trained earlier by J. S. Gamble and had brought out a Handbook of the Forest Flora of Chakrata, Dehra Dun, etc. for the use of Forestry students at the then Imperial Forest School, Dehra Dun. Kanjilal's forms the pioneering Indian effort at a planned study of Assam's Flora. He obtained collections of plants from the forest staff spread throughout Assam, and through a few English residents at Shillong, who continued the traditions of their countrymen of an earlier period.

The specimens, mounted on whatever available paper, of different sizes, colours and

texture, had mounted to an appreciable extent, outgrowing the space in the room of the conservator of Forests. In 1927, the collections were moved to a separate room in the Assam Secretariat and came to be called the Assam Forest Herbarium. Kanjilal kept a meticulous record of field notes (preserved in ASSAM Herbarium, Shillong) and got his collection identified or confirmed at the Sibpur Herbarium. However, his projected Flora of Assam got slowed down, with his retirement, and even before the publication of the first volume he expired on 25th October, 1928. In one of those unusual coincidences, like the father and son succession of Hooker and De'candolle, P. C. Kanjilal, succeeded his father, expanded the collections to 40,000 specimens, arranged them in Herbarium Cupboards, secured distinct staff, and housed the 'Assam Forest Herbarium in a building of its own. Sri G. K. Deka who joined in 1930 as an Assistant Mounter, was also concerned with the proper organisation of the Herbarium, and for a substantial addition to the plant collections. Some of the other members who may be mentioned here are Sri Ram Sharma, mounter, Dina Nath Pal, carpenter, who prepared wood samples (unfortunately the vouchered wood collections were not transferred to the BSI). Rajan De and Dinanath Kalita, specimen poisoners, and Rukhie Sunar, Fieldman, and Hareshwar Deka who joined as Assistant Mounter. Swarup Ram Talukdar and Mono Ranjan Dhar were two other specimen poisoners of the former Herbarium.

A. Das, became the Silviculturist and Botanical Forest Officer in 1931 and took charge of the publishing of the Flora of Assam. During his time Vols. I (pt. 1. & 2) II, III & IV were all published (1934-40). Others who participated were C. S. Purakayastha and R. N. De, both Forest Officers. Amongst the Regional Floras mostly authored by English Forest Officers or

Botanists, the Flora of Assam stands out as the first Regional Flora, brought out by indigenous talent.

In 1936, N. L. Bor, a versatile Irishman, became Botanical Forest Officer. Earlier, apart from his service in the Forest Research Institute and Colleges, Dehra Dun, he had been a political officer in the Naga Hills, and in Aka Hills (Kameng). With an interest in grasses, unusual for a Forest Officer, he made extensive collections of grasses, took and studied them at Kew, and added Vol. V to the Flora of Assam, dealing with Gramineae (1940). M. M. Srinivasan and then M. L. Saikia succeeded to the post of Silviculturist and Botanical Forest Officer. It was M. C. Jacob then Chief Conservator of Forests who transferred the Assam Forest Herbarium together with its staff to the newly revived Botanical Survey of India on 9th August, 1956, simultaneously marking the end of a period of Forest Botany with its achievement of the 5-volume Flora of Assam, and the beginning of a fresh era of floristic exploration by the Botanical Survey of India.

Before outlining the work of the Botanical Survey of India, it is necessary to mention the names of a few other interested plant collectors. Sister Dogmar of the Oxford Mission, collected plants in the Khasi Hills and maintained water colour sketches. These are now in the British Museum. L. L. Read, an Agricultural Inspector in the Government fruit garden at Shillong also collected in the Shillong hills. Brother Gadfray, Rev. W. J. Wenger and Rev. R. H. Lorrin, all collected in the Lushai Hills (Mizoram), as also Mrs. N. E. Parry whose collections were studied by C. E. C. Fischer and published in the Records of the Botanical Survey of India 12 (1). 1938. Of these, 1360 specimens are in the Assam Forest Herbarium. Frank Kingdon-ward (1960) collected in 8 different expeditions. His field numbers 19205 to 20300 totalling 1105 specimens are in the Herbarium at Shillong.

Plant collections, roughly in the nine decades of the Assam Forest Herbarium covered the Assam valley, and the Shillong plateau and a few far-flung outposts in the Hills, and were mostly representative of the woody flora, reflecting the natural interest of Forestmen. The Botanical Survey of India, Eastern Circle, at Shillong, planned on a thorough floristic exploration and survey of all kinds of plants. In the two decades of its existence, the officers have undertaken periodic explorations in several hitherto unexplored areas. The forest Herbarium collections amounting approximately to 40,000 has been now enriched, and increased nearly twice. R. S. Rao and G. Panigrahi, the first two officers of the Eastern Circle have carried out explorations principally in the Eastern Himalayas. They have published the results, outlining the vegetation and enumerating the species, mostly in the Bulletin of the Botanical Survey of India. Their paper : Distribution of vegetational types and their dominant species in Eastern India in the Journal of the Indian Botanical Society 40 : 274-285, 1961, gives some salient points in the floristics of the area. D. B. Deb has studied the flora of Manipur and subsequently of Tripura. He has also explored the flora of Tirap, at the extreme end of Arunachal Pradesh. In an effort to complete the hitherto incomplete 'Flora of Assam' monocot plant collections in the Herbarium were augmented and in several instances live collections brought together in the Experimental Garden. Based on these a study of the Cyperaceae, has been completed by D. M. Verma, while several more monocot families have been worked out and published by A. S. Rao and D. M. Verma. The Flora of Jaintia hills has been prepared by N. P. Balakrishnan while the flora of Nongpoh, a midway area between Gauhati and Shillong has been worked out by J. Joseph.

In view of the obviously rich orchid flora in the region, a National Orchidarium was

started in 1959. It has now a collection of 5,000 plants representing 350 species. Based on a detailed study of these, S. K. Katak, has prepared an account of the Orchids of Khasi & Jaintia Hills. The Indian Council of Agricultural Research sanctioned a co-ordinated Floriculture scheme for breeding Orchids and bulbous plants using the germ-plasm collection of the Orchidarium. Interesting live collections of plants from the areas under exploration have been introduced in the Experimental Garden at Barapani and Shillong. Careful phenological data and cultural responses of such introduced plants are being maintained.

The results of plant explorations, the vegetation and Flora of the North-Eastern Region, including endemics, rare and endangered plants, has been reviewed and documented by A. S. Rao (1974, this contains references to publications on Floristics in the area). In the last four years S. K. Jain extended exploration in Arunachal Pradesh, Meghalaya and in Nagaland. He established a new center at Itanagar to expedite exploration in Arunachal Pradesh.

These efforts of the last 22 years, with the back drop of earlier work in the area, has given us only glimpses of the rich flora of this region. Nearly 40% of the area is still covered by forests, and rapid development of the region is threatening to despoil the flora, before a full knowledge of it could be obtained. This area with its several primitive flowering plants has been of special interest to plant geographers, as an area of possible origin of the flowering plants (Takhtajan, 1969). It is an area of great importance as a centre of diversity for cultivated plants. A multitude of tribal people, with a close dependence on wild plants, inhabit the various hills, and this is of considerable significance to the Ethnobotanists. The very many wild plants with fine foliage and beautiful flowers,

of potential interest to garden-lovers and Horticulturists, await introduction into our Gardens. Then, there are the several drug yielding plants, some of them already almost extinct, that need special attention. The future strategies then, should include a massive crash programme of plant exploration and collection in the hitherto unvisited areas. This needs to be done not only by the officers and staff of the Botanical Survey, but also by many others, particularly in the universities, in Forest & Agriculture departments and plant-based Research Institutions. The collections need fairly comprehensive field notes, and graphic data in the form of photographs and kodachromes. Specific enquiries need to be made on plants of local use, and those that are disappearing consequent on an indiscriminate use of such plants. It is necessary that these collections should be satisfactorily housed, with adequate work space and other associated requisites, to enable a rapid completion of studies of such collection and preparing the material for publication, which should also be ensured. Such botanical studies of limited areas, in great detail, would not only furnish all the floristic data, but also train up a cadre of skilled young botanists, who can confidently and continually contribute to the preparation of the Flora of India. Out of such a census and compendium of the National flora would emerge gradually, various aspects of applied Botany and the useful elements of our floristic cornucopia.

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