

EASTERN CIRCLE OF THE BOTANICAL SURVEY OF INDIA**R. SESHAGIRI RAO,***Regional Botanist, Eastern Circle, Shillong***G. PANIGRAHI,***Systematic Botanist, Eastern Circle, Shillong*

The present set up of the Botanical Survey of India came into being as a result of its reorganisation in 1954. After independence, with the country's progress and rapid advancement in various directions, the importance of exploring and assessing country's vegetable wealth had been well realised. Hence, the Department of Botanical Survey, whose vigorous activities were kept in abeyance for more than 40 years was reorganised in 1954. The Eastern Circle, with its present Headquarters at Shillong is a result of this reorganisation.

EASTERN CIRCLE, ITS BEGINNING, JURISDICTION AND LOCATION

The Eastern Circle comprising of Orissa, Bihar, West Bengal, Assam, Tripura, Manipur, N.E.F.A. (North East Frontier Agency) and Sikkim with its temporary Headquarters at Calcutta started functioning from 1.2.1956 with the appointment of Shri R. S. Rao as the Regional Botanist. But the Headquarters was soon transferred to its permanent place at Shillong as decided in the reorganisation plan with effect from 1.4.1956. Since then, it has been located in 'Nirala' bungalow in Nongthymmai, a rented building with 4012 square ft. plinth area. From July, 1959 an additional building 'Ravi lodge' in New colony with a plinth area of 2735 sq. ft. has also been hired to provide for increasing demand for floor space.

Functions

The main function of the Eastern Circle may be said to be the botanical collections and explorations in the unexplored and under-explored regions for assessing the floristic composition of the states and territories. The areas included in this region are full of virgin forests and there are large tracts of hilly and mountainous country covered with thick impenetrable forests. Naturally, the flora is very rich and shows great variations both in its range and types of vegetation, conditioned by the varying nature of the soil, climate and altitude. The ultimate object of the collection and exploration tours in the region will, therefore, be the preparation of the revised flora of India and to study the relationships of the Indian flora with those of its neighbouring countries and the world as a whole.

Incidental to the above, the study of the potential

plant resources of the country with particular reference to medicinal, oil-yielding, poisonous, insecticidal and essential oil-bearing plants will also receive adequate attention. The great richness of the Indian forests regarding the occurrence and distribution of medicinal plants is too well recognised from the ancient period and the Botanical Survey of India will have splendid opportunities to collect the indigenous plants together with the report of their medicinal and other uses.

During the collection and exploration tours, attempts are made to collect and supply plant materials and other technical informations to numerous research scholars working in universities and other research institutes and laboratories both in India and abroad for furtherance of research. This has incidentally turned out to be one of the important activities of this Circle.

Another immediate objective of the Eastern Circle is to gather the relevant information regarding the occurrence and distribution of the monocot families in the Assam flora with a view to collect data for compiling the Monocot Volume of the "Assam Flora", the absence of which leaves a serious gap in the botanical knowledge of the area.

It is also intended to prepare a check list of the Flora of Shillong and its surroundings by listing plants growing within a radius of 10 miles of Shillong.

Lastly, Eastern Circle will also collect, cultivate and propagate the rich orchid flora of Assam and other areas included in this Circle to serve as the nucleus for a National Orchidarium, proposed to be developed and maintained.

Inter-relationship between Eastern Circle and State Governments and Other Government of India Organisations

The jurisdiction of the Eastern Circle over several States and territories, as well as the nature of its functions, bring it in close contact with the State Governments and other administrative authorities without whose active co-operation botanical exploration and collection studies in the far flung jungle clad mountainous country-sides in their respective states will be well nigh impossible. Yet, it is in these impenetrable primeval reserve-forests that materials of real interest to the botanist are found and they form the rich store house of

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Eastern Circle, Botanical Survey of India, Shillong.

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Parts of Orchid House at the Eastern Circle showing a few interesting species of Dendrobium, Paphiopedilum, Goodyera and Phaius.

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the country's potential vegetable wealth. But being stationed in Shillong it is difficult for the officers of the Botanical Survey to have a comprehensive up-to-date picture of the road communication to and existence of jeepable roads and footpaths within the reserved forests, and location of suitable camping sites. Hence, close collaboration between the administrative and forest departments of the State Governments and territories on the one hand and Botanical Survey of India on the other is essential. Similarly, for the protection of the touring parties inside the jungles infested with wild animals, provision of armed escort is made by the State Governments, wherever necessary. To aid in the exploration work in States other than Assam, requests are made by this Department to the District authorities to provide a jeep and trailer for the movement of the touring party and to carry large number of Government loads containing surveying equipments. For this, payment towards cost of propulsion of the jeep is made by this department to the State Government under the existing rules.

Botanical Survey also maintains close and healthy relationships with a few other Central Government Departments. Central Drug Research Institute, Lucknow is very helpful in carrying out chemical analysis of reports of the medicinal use of such indigenous drugs by the native populace. Forest Research Institute, Dehra Dun and the Department of Botanical Survey are trying to collaborate with each other in exchanging viable seeds of medicinal species and other species of economic importance for cultivation and propagation; they are now making attempts to list the rare species in Indian flora which are in danger of extinction. National Botanical Garden, Lucknow are supplied with live specimens of interesting species in Indian flora collected by this Circle from time to time, for cultivation and propagation. Authorities of some of the Vigyan Mandirs have been provided with herbarium specimens of a number of medicinal plants and insectivorous plants for exhibition in their Vigyan Mandirs.

In collaboration with the Council of Scientific and Industrial Research, New Delhi a number of Junior Research Fellowships are being offered to meritorious candidates for working on Indian flora under the auspices of the Botanical Survey of India. The Universities of Utkal, and Banares have recognised the Eastern Circle as a research centre for work for Ph.D. degree for the alumni of their universities and the question of such recognition is under the consideration of Patna and Gauhati universities.

THE FOREST HERBARIUM AND ITS TRANSFER

Concurrent to the decision to establish the Eastern Circle of the Botanical Survey of India at Shillong Government of India at the instance of the Chief Botanist

requested the Government of Assam to transfer the Assam Forest Herbarium together with its staff to the control of the Department of the Botanical Survey of India to serve as the nucleus of the Shillong Herbarium of the Eastern Circle in view of its importance for comparison and study of Assam Flora. Government of Assam readily agreed to the proposal, but stipulated three conditions which were mutually acceptable. The terms and conditions are:—

- (a) If at any time the Botanical Survey of India decides to remove its office from Shillong or Assam they will return to the State Government all the articles in the Herbarium which they are now taking over.
- (b) The staff of the Assam Forest Department and other technical Departments of the State Government should have unrestricted access to the collection consistent of course with its safety and preservation.
- (c) The Botanical Survey of India should proceed with the revision of the publication, "Flora of Assam" in so far as its existing volumes are concerned, as well as to compile a volume to cover the Monocotyledons with or without the assistance from the State Government as the Government of India decide.

In accordance with this mutually agreed decision, the transfer of the Forest Herbarium with the rich collections of 80,000 sheets contained in 14 wooden almirahs was effected on the forenoon of the 9th August, 1956. Simultaneously, six members of its establishment staff, were also taken over on deputation, to be treated as temporary central government employees until they are permanently absorbed by the Government of India.

The History and Importance of the Forest Herbarium

The history of the Assam Forest Herbarium can be traced back to 1873 when Gustav Mann became the first Conservator of Forests in Assam. He was a very keen forest officer and took great interest in the study and collection of various species in the Assam's immense potential forest wealth. His collections which are very carefully preserved, formed the nucleus of the Forest Herbarium. Although Wallich, Griffith, Hooker and Clarke explored botanically parts of the province of Assam including Khasi Hills in the second half of the 19th century, these collections were deposited in herbaria outside Assam either at Sibpur or elsewhere. Similarly, enthusiastic collectors like Klein De Sylva, Peal and Jenkins contributed large number of specimens to Sibpur Herbarium. All the same, it can be said that the flora of this part of India was largely unknown, and there was no comprehensive "Flora of Assam".

In 1912 Sir Archdale Earle, the then Chief Commis-

sioner of Assam keenly felt the desirability of finding out the economic aspect of the vegetation of a province like Assam which with its variable climate has a distinguished place in the forestry of India. He was very anxious to have a complete "Flora of Assam" which besides being useful to the forest officers for the identification of trees in their forests should also be of interest to residents of Assam.

With a view to meet these objectives, Rai Bahadur U. N. Kanjilal, Extra Deputy Conservator of Forests and a distinguished botanist was entrusted with the work in 1913 with the approval of the Government of India. He toured throughout the province for several years and made representative collections from among the forest flora. U. N. Kanjilal not only collected specimens and preserved them, but also wrote comprehensive field notes on the various species collected by him. His records are an invaluable contribution to the Science of Botany of the province and are carefully preserved to date. To preserve the collections for compiling the "Flora of Assam" and also to serve the purpose of future reference the organisation of a herbarium became essential and a start was made.

About the year 1929 the botanical branch was started in the Assam Forest Department and a botanical forest officer was appointed for collection and record of the various species. Since then the herbarium has been gradually enriched by collections made by the botanical forest officers, such as P. C. Kanjilal, A. Das, C. Purkayastha, N. L. Bor, R. N. Dey, M. L. Saikia and their staff, such as R. Sharma, G. K. Deka and others. Subsequently collections of Mrs. N. E. Perry in the Garo and Lushai Hills and that of Dr. N. L. Bor in the Naga Hills and Aka Hills have been added to this herbarium. As a result, the Herbarium contained about 80,000 sheets of Angiosperms, Gymnosperms, and Pteridophytes up to July, 1956.

As such the herbarium is of high scientific value. It

has been serving the public, scientific departments, universities and various other institutions in identifying and helping to supply specimens of trees and shrubs for research on drugs and insecticides etc. Assam Herbarium has also contributed to the herbaria at Sibpur, Dehra Dun and Kew amongst others. For the purpose of reference and matching specimens, eminent botanists from Italy, China, and Japan visited or consulted the herbarium to their great delight and benefit. Thus, the herbarium has been a living institute, disseminating knowledge in forest botany, silviculture and utilisation and it is on the basis of collections housed in this Herbarium that the "Flora of Assam" under the joint authorships of U. N. Kanjilal, P. C. Kanjilal, A. Das, C. Purkayastha, and R. N. Dey had been published in four volumes (Vol. I consisting of 2 parts) between the years 1934 to 1940. Vol. V of this series by Dr. N. L. Bor published in 1940 dealt with Gramineae only and was based on specimens from Assam but available in more than one herbarium. Except for Gramineae, among Monocotyledons, the Flora of Assam did not deal with any of the families in that large group of plant species. This was, possibly because of the scope of the Flora as defined by the Assam Government then, to be consistent with the general requirements of a "Forest Flora" which normally excludes the herbs, unless they prove of great economic importance.

In spite of this deficiency "Flora of Assam" is a very helpful guide to Assam's forest flora, the great merit of the work being that the flowering and fruiting seasons of every species described have been indicated in proper places. The herbarium is also valuable for the type sheets of species, new to science and described in "Flora of Assam" deposited in this Forest Herbarium.

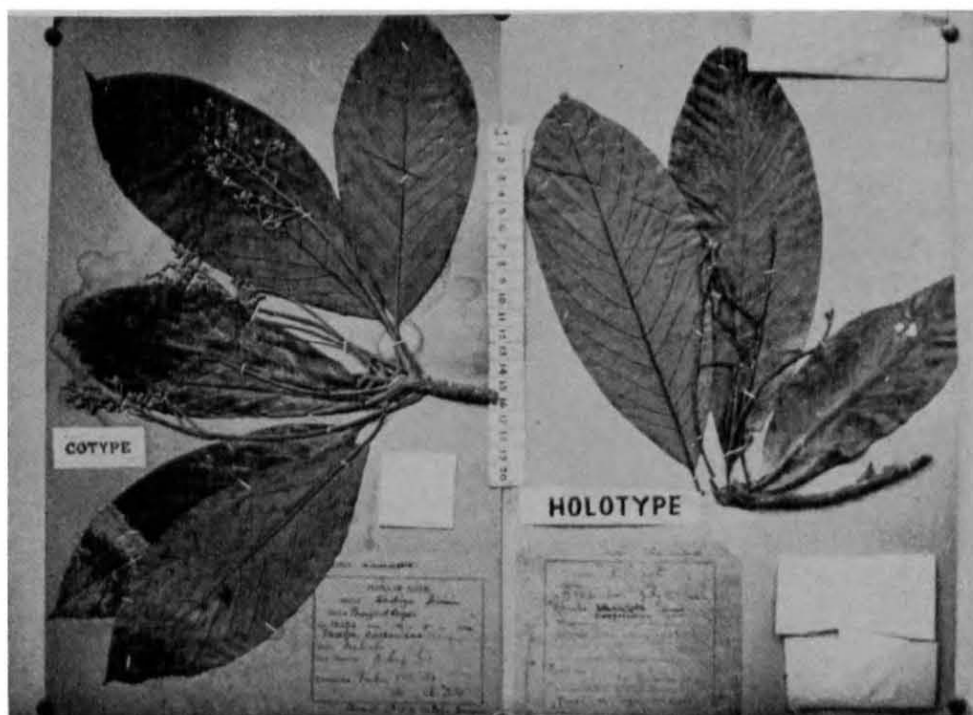
The following type-sheets are deposited in the Herbarium of the Eastern Circle, Botanical Survey of India, (Formerly known as Shillong Forest Herbarium) Shillong.

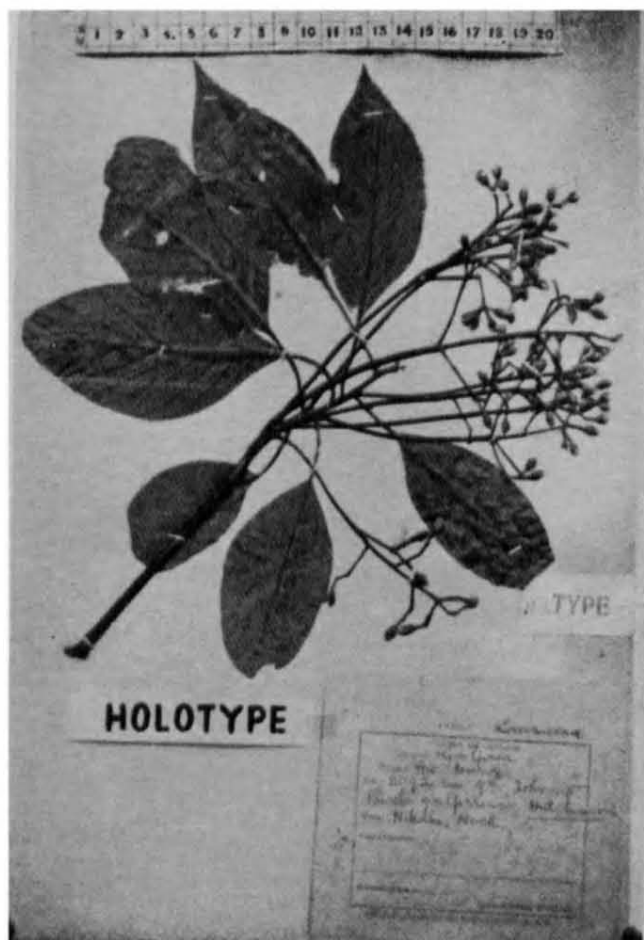
Name of species	Name of collector & Number	Locality	Nature of type-sheets	Reference
1	2	3	4	5
MAGNOLIACEAE				
<i>Pachylarnax pleiocarpa</i> Dandy	A. Das 9635	Digboi, Lakshimpur, Assam.	Syntype	Jour. Botany, 71 , Nov. 1933 ; Assam Forest Records (Bot.) 1 , July 1934.
TERNSTROEMIACEAE				
<i>Eurya japonica</i> Thunb. var. <i>nitida</i> Korth. forma <i>kanjilali</i> Debbberman et Biswas	U. N. Kanjilal 6780	Dehing bank, North Cachar Hills,	Isotype	Assam Forest Records (Bot.) 1 , July 1934.
STERCULIACEAE				
<i>Mansonia dipikae</i> C. S. Purkayastha	C. S. Purkayastha 21865	Rangapahar, Sibsagar, Assam.	Lectotype	Indian Forester, 73 : 1 , 1947.

Holotype of Agapetes kanjilali A. Das

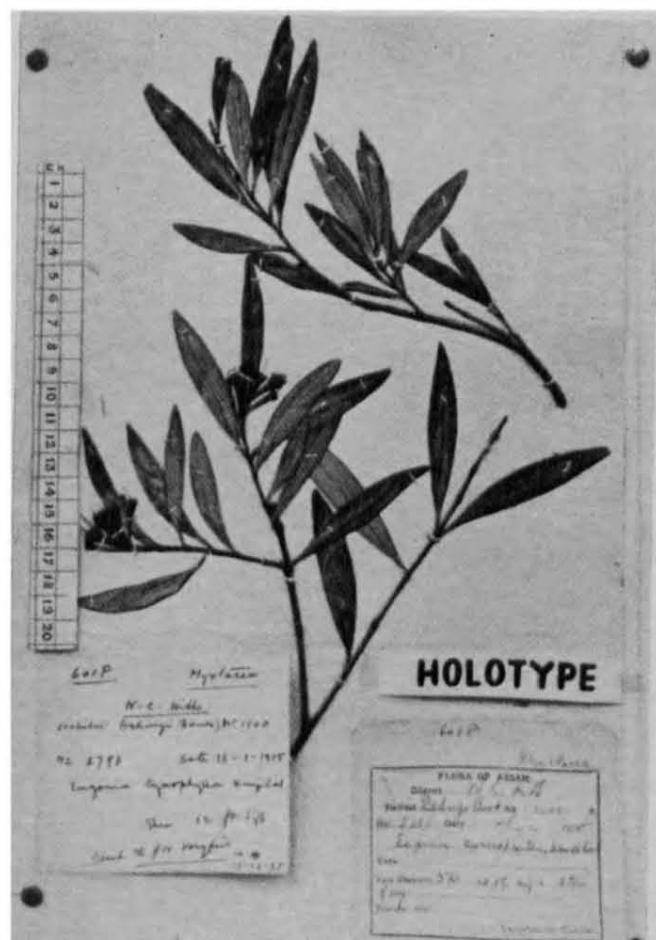


Holotype and Paratype of Phoebe cooperiana U. N. Kanjilal ex A. Das





Holotype of Phoebe goalparensis Hutchinson.



Holotype of Eugenia cyanophylla P. C. Kanjilal et A. Das

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Name of species	Name of collector & Number	Locality	Nature of type-sheets	Reference
1	2	3	4	5
HIPPOCRATEACEAE				
<i>Salacia khasiana</i> Purkayastha	S. R. Sharma 13541	Umteswar Forest, K. & J. Hills, Assam.	Lectotype	Indian Forester, 64, May 1938.
ANACARDIACEAE				
<i>Rhus kanaka</i> R. N. De	S. R. Sharma 18452	Below Pattakhana near Barapani, K. & J. Hills, Assam.	Holotype	Indian Forester, 68, Feb., 1942.
CAESALPINIACEAE				
<i>Gymnocladus assamicus</i> U. N. Kanjilal ex P. C. Kanjilal	U. N. Kanjilal 7624 A. Das 10548	Laitkseh, Khasi Hills (5000') Laitkseh and Marngor, K. & J. Hills, Assam.	Syntype	Assam Forest Records (Bot.) 1, July 1934.
MYRTACEAE				
<i>Eugenia cyanophylla</i> P. C. Kanjilal et A. Das	U. N. Kanjilal 601P/6786	Dehingi bank (1500') North Cachar Hills, Assam.	Holotype	Assam Forest Records (Bot.) 2, Oct., 1937.
<i>Eugenia assamica</i> Biswas et Purkayastha	C. S. Purkayastha 13491 C. S. Purkayastha 13070	Pasighat near Pillung (Sadiya), Assam. Pasighat near Pillung (Sadiya), Assam.	Isotype Paratype	Kew Bulletin Misc. information No. 6, 1938. <i>Ibid.</i>
LYTHRACEAE				
<i>Lagestroemia minuticarpa</i> Debbarmann ex P. C. Kanjilal	U. N. Kanjilal 3107 P. C. Kanjilal 9512 P. C. Kanjilal 9513	Near Bomjur (425') N. E. Frontier, Assam. Birung, U. S. Forests, N. E. Frontier, Assam. Lalinadi, Birung Forests (Sadiya) N. E. Frontier, Assam.	 Syntype	 Assam Forest Records (Bot.) 1, July 1934.
VACCINIACEAE				
<i>Agapetes kanjilali</i> A. Das	U. N. Kanjilal 4090	Makum Range (Jaipur range), Lakhimpur, Assam.	Holotype	Assam Forest Records (Bot.) 1, July 1934.
SAPOTACEAE				
<i>Diploknema</i> <i>butyraceoides</i> (Scott) H. J. Lam	U. N. Kanjilal 3137	Nizamghat (500') N.E.F. Agency	Isotype	Blumea 9(1): 81, 1958.
EBENACEAE				
<i>Maba cacharensis</i> A. Das et P. C. Kanjilal	U. N. Kanjilal 3653 A. Das 10548	Dulong river (340'), Lakhimpur, Assam. Cachar Divn., Assam.	Syntype	Assam Forest Records (Bot.) 1, July 1934.
STYRACEAE				
<i>Symplocos pealii</i> King ex A. Das	U. N. Kanjilal 6868 U. N. Kanjilal 4744	Makum range, Lakhimpur, Assam. Barak I. L. Reserve Cachar, Assam.	Syntype	Assam Forest Records (Bot.) 1, July 1934.
OLEACEAE				
<i>Ligustrum robustum</i> Bl. var. <i>khasiana</i> U. N. Kanjilal	U. N. Kanjilal 5925	Nongkersin to Nongstoin, K. & J. Hills, Assam.	Holotype	Flora of Assam 3, 240, 1939.
APOCYNACEAE				
<i>Microchites sabitae</i> De et Narayanaswami	S. R. Sharma 10139	22nd mile, Cherra Road, K. & J. Hills, Assam.	Holotype	Indian Forester, 66, June 1940.
<i>Microchites sabitae</i> De et Narayanaswami var. <i>laxiflora</i> De et Narayanaswami	S. R. Sharma 12785	Sohrarain (alt. 5000'), K. & J. Hills, Assam.	Holotype	<i>Ibid.</i>
LABIATEAE				
<i>Pogostemon dasianus</i> De et Mukherjee	G. K. Deka 17721	Govt. Fruit Garden, Shillong, K. & J. Hills, Assam.	Holotype	<i>Ibid.</i>

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Name of Species	Name of collector & Number	Locality	Nature of type-sheets	Reference
1	2	3	4	5
LAURACEAE				
<i>Machilus globosa</i> A. Das	A. Das 10640	Charduar Res. (100'-300'), Darrang, Assam.	Holotype	Assam Forest Records (Bot.) 2, Oct. 1937.
<i>Machilus dubia</i> A. Das et P. C. Kanjilal	Shillong Herbarium No. 10778	Sibsagar, Assam.	Holotype	Assam Forest Records (Bot.) 2, Oct. 1937.
<i>Phoebe cooperiana</i> U. N. Kanjilal ex A. Das.	H. L. Cooper 7722	N. E. Frontier, Assam.	Holotype and Isotype	<i>Ibid.</i>
	A. Das 10634	Pasighat Range, Sadiya Divn., Assam.	Paratype	<i>Ibid.</i>
<i>Phoebe goalparensis</i> Hutchinson	U. N. Kanjilal 5092	Aie Reserve, Goalpara, Assam.	Holotype and Isotype	<i>Ibid.</i>
<i>Purkayasthaea</i> <i>pseudomicropora</i> Purkayastha ex Narayanaswami	C. S. Purkayastha 13592	Digboi, Lakhimpur, Assam.	Syntype	Indian Forester, 64, May 1938.
THYMELAEACEAE				
<i>Daphne shillong</i> Banerjee	U. N. Kanjilal 2373 U. N. Kanjilal 2629	Upper Shillong, Khasi Hills, Assam. Laitlynkot (6000'). Khasi Hills, Assam.	} Paratype	Kew Bulletin, 1927, 75 (1927).
LORANTHACEAE				
<i>Viscum album</i> Linn. var. <i>meridianum</i> Danser	R. N. De 14461	Japu forest, Naga Hills, Assam.	Holotype and Isotype	Blumea 4: 274, 1941.
CUPULIFERACEAE				
<i>Quercus milroyii</i> Purkayastha	U. N. Kanjilal 3171	Near Pillung, N. E. Frontier, Assam.	Syntype	Indian Forester, 64, May 1938.
GRAMINEAE				
<i>Ischaemum hubbardii</i> Bor	N. L. Bor 21368	Cherrapunji, K. & J. Hills, Assam.	Isotype	Indian Forest Records (Bot.) 1: 3, 98, 1938.
<i>Paspalum longifolium</i> var. <i>lorirhachis</i> Bor	N. L. Bor July 1937	Bhomraguri, Darrang, Assam.	Isotype	Flora of Assam, 5, 253, 1940.
<i>Rottboellia goalparensis</i> Bor	A. Das 10471	Kachugaon, Goalpara, Assam.	Isotype	Indian Forest Records (Bot.) 1: 3, 100, 1938.
<i>Themeda huttonensis</i> Bor	N. L. Bor 6717	Laruri, Naga Hills, Assam.	Isotype	Indian Forest Records (Bot.) 1: 3, 95, 1938.
<i>Deyeuxia nagarum</i> Bor	G. K. Deka Sept., 1937	Japvo, Naga Hills, Assam.	Isotype	Indian Forest Records (Bot.) 1: 3, 69, 1938.

Assam Forest Herbarium, on transfer, therefore, has been integrated into and now forms part of the Shillong Herbarium of the Botanical Survey of India and has been a great asset for pursuing floristic studies on the Eastern India. In this re-organised condition, collections of U.P. Kanjilal from outside Assam and also the type sheets have been kept separate for ready reference. The rich collections of medicinal plants have been separated out and notes on their therapeutic uses have been appended. All the old sheets have been checked and re-poisoned wherever necessary to ward off insect damage. The wooden almirahs for herbarium are being gradually replaced by steel cupboards to afford better protection against any damage.

Spermatophytic Herbarium

The exploration and collection tours have yielded dried herbarium specimens of both flowering and non-flowering plants numbering about 72,500 comprising 16,000 species up to September 1959. All these specimens have been poisoned and 41,500 sheets mounted for incorporation into the herbarium. All the specimens collected have been identified to their respective families and are arranged in family-wise folders. The identification to species is being pursued with the help of the Central National Herbarium at Calcutta, as also with the help of the 80,000 specimens of the former forest herbarium which, on transfer, have been integrated to Shillong Herbarium.

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Cryptogamic Herbarium

Realising the relative dearth of a good cryptogamic herbarium in India, the Eastern Circle has paid special attention to the building up a Cryptogamic Herbarium with representative collections of Algae, Fungi, Lichens and Bryophytes from Eastern India. All these collections have been poisoned, classified, and arranged systematically as far as possible in small wooden boxes so as to fit into the pigeon holes of the steel almirahs. For aiding in the correct identification of these species, specialists in the different groups of Cryptogams, both in India and abroad, are being requested.

Library

Consequent upon the transfer of the Forest Herbarium, at the request of the Botanical Survey of India, Government of Assam also agreed to transfer 72 items of old, out-of-print reference books pertaining to floras, economic botany, etc. together with a few items of old issues of journals from the library of the Forest Department to the Library of the Eastern Circle. Amongst these are included—

- (a) Gamble—*Flora of the Presidency of Madras*.
- (b) Talbot—*Forest Flora of the Bombay Presidency*
- (c) Beddome—*Flora Sylvatica*
- (d) Watt—*Dictionary of Economic Products of India*.

These and many others added to the library of the Eastern Circle have been of immense value as reference books and our warmest appreciation is recorded to the Government of Assam for the noble gesture in transferring the Herbarium and a part of Forest Department Library.

At present, the Library of the Eastern Circle comprises of 411 items of books bearing on Taxonomy, Flora, Plant Geography and Ecology. A set of Index Kewensis together with its supplements have also been procured. Besides there are a number of books dealing with economic plants and those of medicinal importance including a set of publications on medicinal plants by Kirtikar & Basu.

At present, 37 different journals dealing with various aspects of Systematic Botany and Plant Geography are being subscribed both from India and abroad.

UNEXPLORED AND UNDEREXPLORED REGIONS

The unexplored and underexplored areas in the different States within the Eastern Regional Circle are given below:—

A. Unexplored Regions :

I. ORISSA :

- (1) Heavily forested tract of Simlipal Hills of Mayurbhanj with Meghasini Peak (3823').

- (2) Rebna and Ranjagarh hills south of Keonjhar.
- (3) Secluded valleys east of Bonaigarh.
- (4) Bhuinya hills north of Pal Lahara.
- (5) High lands of Kalahandi (with peaks beyond 5000')
- (6) High lands of Koraput (with peaks beyond 5000')
- (7) High lands near Khariar.

II. SIKKIM :

- (8) Interior parts along Northern Chola Ranges.
- (9) Interior parts along Northern Singalelah Range beyond Jongri.
- (10) Northern Sikkim Beyond Jemu and Llonak Valleys.

III. BHUTAN :

- (11) Almost the entire State is unexplored. There are, however, a few regions of higher altitudes explored by the British plant collectors. At present, there is, however, no permission for the Indian Botanists to explore the Bhutan State.

IV. NORTH EAST FRONTIER AGENCY :

- (12) Excepting a small region along the Abor hills in Siang Frontier Division where exploration by Burkill was carried out and a few spots along the higher altitude areas in some of the frontier divisions visited by British plant collectors,—the entire area of NEFA comprising Kameng Frontier Division, Subansiri Frontier Division, Siang Frontier Division, Lohit F. Division, Tirap F. Division, and Tuensang F. Division is botanically unexplored.

V. ASSAM :

- (13) A small tract along Nongstoin in Khasi & Garo Hill States.
- (14) A small tract along Mikir Hills.
- (15) Lushai hilly tract along the Burma border and partly along the East Pakistan border.

VI. MANIPUR :

- (16) Manipur hilly tract along the Burma border.

B. Under Explored Regions

I. ORISSA :

- (1) Hilly tracts near Jeypore and Koraput towards Madhya Pradesh and Andhra Pradesh borders.
- (2) Hilly tract north of Jeypore and Koraput.
- (3) Hilly tract north of Rayagada.
- (4) Hilly tract near Russelkanda, Subarnagiri and Phulbani areas.
- (5) Hilly tract near Bolangir and Khariar areas.
- (6) Hilly tract northwest of Sambalpur along Madhya Pradesh border.

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- (7) A small hilly tract between Chilka lake and Ranpur and also a few islands of Chilka lake.
- (8) Swamps along the deltas of the Mahanadi and Dharma rivers.
- (9) Hilly tract west of Bonaigarh and Pal Lahara.
- (10) A small hilly tract east of Rairakhol.

II. BIHAR :

- (11) Hilly tract in Suranda hills south of Chaibassa and Chakradharpur.
- (12) Hilly tracts surrounding Ranchi.
- (13) Hilly tract west and north of Lohardaga along Madhya Pradesh border.
- (14) Forest tracts north of Hazaribagh.
- (15) A few tracts in Kaimur hills, south of Sasaram.
- (16) Rajgir hills near Gaya.
- (17) Karakpur hills south of Monghyr.
- (18) Forest tracts in Rajmahal hills.
- (19) Someswar hills along Nepal border.
(There are, however, a few under explored areas along the Gangetic Plain and along Nepal border.)

III. WEST BENGAL :

- (20) A few forest tracts along Damodar Valley.
- (21) Forest tracts near Jalpaiguri, Alipur Duar and Buxa Duar along Bhutan border.
(There are, however, a few under explored areas along Sundarban).

IV. SIKKIM :

- (22) A few mountaineous tracts along southern and northern Sikkim.

V. NORTH EAST FRONTIER AGENCY :

- (23) Terai area in Kameng, Subansiri and Siang Frontier Divisions along the Assam border and also parts of Abor hills in Siang Frontier Division.

VI. ASSAM :

- (24) The entire terai belt along the borders of Bhutan and NEFA and the lower hilly tract along the Naga Hills.
- (25) Forest tracts in Garo Hills.
- (26) Forest tracts surrounding unexplored area in Khasi and Garo hills.
- (27) Forest tract in Kamrup District.
- (28) Forest tract in Sibsagar District.
- (29) Forest tract surrounding unexplored area in Mikir Hills.
- (30) Forest tract in North Cachar Hills.
- (31) Northern and Southern forest tracts in Cachar District.
- (32) Forest tract in adjacent to the unexplored region and central-part in Lushai Hills District.

Method of Working out Floras :

With a view to carry out planned and systematic botanical surveys the unexplored and underexplored areas included in this Circle have been determined after careful study of all the available literature and records on the subject and mapped out for future references also. It is intended to visit the same area in 4 different seasons to record the seasonal variations in the flora and to maintain adequate field notes following the standardised methods of the Botanical Survey of India.

For the Shillong Flora a guide map of Shillong depicting the roads and streams on it, has been prepared, with a view to carry on a planned and systematic detailed survey of the flora of Shillong within a radius of 10 miles round about the city. Study of the flora of Shillong is being made from different localities, bounded by roads.

Compilation of the Monocot Volume of the Flora of Assam

To carry out the objectives with regard to the preparation of the Monocot volume of the Flora of Assam, details of the species belonging to 18 monocotyledonous families included amongst the 80,000 sheets of the former Herbarium of the Assam Forest Department have been gathered. In addition, about 1956 specimens belonging to 436 monocot species have been collected from the field from different districts of Assam during collection tours.

National Orchidarium :

Orchids are a very highly popular group of flowering plants and are universally accorded the first place in nature from an artistic and aesthetic point of view for the extraordinary beauty and novelty of their flowers. They are also well known for their first rate blossoms borne on tall branching scapes with numerous varieties of colour and constructional types and for their excellent keeping quality.

Although the Orchidaceae is cosmopolitan in distribution orchids attain their highest development in the humid tropical and sub-tropical forests. As such the rain forests of Assam (particularly those in the Khasi & Jaintia Hills District and Patkoi ranges in the Naga Hills), Manipur, NEFA, and Sikkim provide ideal and natural conditions for profuse development of Orchids and have been well-known hunting grounds for centuries.

The scientific objective of the National Orchidarium is to carry out a thorough systematic revision of the Indian Orchidaceae with a view to determine the number of different genera and species of orchids in our flora as well as their ecological habitat and the range of distribution in the world flora as a whole.

Such scientific revision, particularly of the family Orchidaceae cannot be carried out in an exhaustive manner only with the help of dried herbarium specimens. Study of living material particularly in the flowering stages is essential to determine the status and affinities of various taxa. Further, such inter-relationships are best determined by interspecific and intergeneric hybridisation which also result in the synthesis of new genera and varieties combining attractive colours with marvellous forms of flower construction and design and are reckoned as the outstanding prize winners of the day in all national and international orchid shows.

To do this, the Eastern Circle has the best of opportunities and facilities, as the officers visit the orchids in their 'natural home' during their collection tours in the orchid-rich states and territories lying within their jurisdiction. As such, in addition to about 2700 dried herbarium specimens, 1000 live specimens belonging to about 700 species (the collections from different localities bearing separate field numbers may be merged in the same species after proper systematic study) have been kept in cultivation in the orchid house improvised in the premises of this office.

The establishment of a National Orchidarium in Shillong under the Eastern Circle of the Department of Botanical Survey is most appropriate and received the favourable consideration of the Government of India. The important consideration weighing with the Government was the offer of the Government of Assam to transfer their Shillong Orchid House, free of cost, to the Botanical Survey of India, which might serve as the nucleus to the National Orchidarium.

The history of the National Orchidarium may, therefore, be traced to the origin of the Shillong Orchid House of the Government of Assam. This Orchid House, however, has a very recent history of less than 10 years. About the year 1950 Shri P. D. Stracey, Senior Conservator of Forests, took interest in the collection and cultivation of orchids. Accordingly, Shri M. L. Saikia, Botanical Forest Officer and Silviculturist, at the instance of Shri Stracey, built a small orchid house inside the Experimental Garden and Nursery at Shillong. The Orchid House is an open wire-netting circular shed consisting of a certain number of vertically posted poles with an unthatched roof on which a climbing species of rose forms some sort of a cover.

There are at present about 150 specimens of epiphytic orchids and another 150 specimens of terrestrial or semi-terrestrial species almost covering the entire orchid house. Most of these are the common orchid species collected by the forest officers and their staff, particularly Shri G. K. Deka during their tour in the reserved forests of Assam without any special effort. But there are also some uncommon orchid species, reported to have been collected from the Patkoi ranges of the Naga Hills. A number of these orchids have been identified by Shri G. K. Deka, formerly of Assam Forest Department and now a Herbarium Assistant in this Department and are, accordingly, labelled.

The original beauty and luxuriance of the Orchid House, however, suffered heavily due to frost damage in the winter of 1955-56, thus resulting in the present unhealthy look and reduced number of specimens. Further, Forest Department have not provided any staff with the specific duty of taking care of the Orchid House, which needs adequate attention to serve as a source of attraction to the tourists visiting Shillong.

Realising that the Orchid House would do better under the care and patronage of the Department of Botanical Survey, Government of Assam proposed to transfer the Orchid Shed together with the orchids, free of cost, to the Government of India. To this Government of India readily agreed but requested the State Government to allow the Orchid Shed and the Orchids to remain where they are at present and to allow the officers of the Botanical Survey of India to grow and cultivate the orchids they collect from time to time, in the Orchid House, until a permanent habitat is found in Shillong for the location of the Regional Office and the National Orchidarium. Government of Assam concurred with the request. Due to limitation of space, however, only some of the orchids collected by this Circle have been transferred and cultivated in the Orchid House, which though under the formal possession of the State Government, have virtually been transferred to Botanical Survey of India.

The nucleus of the National Orchidarium, therefore, may be said to comprise of two wings in Shillong—one located within the Silviculturist's Nursery—with about 300 specimens and the other in the premises of the office of the Regional Botanist, Eastern Circle, with about 1000 specimens up-to-date.