

1949

REPORT OF THE
BOTANICAL SURVEY
OF INDIA
1947-48
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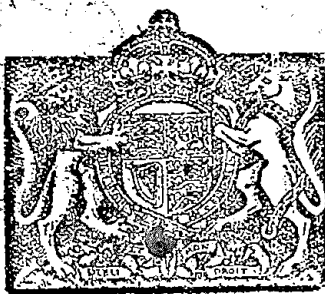
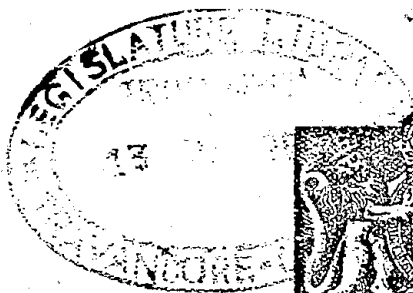
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Report
OF THE
Botanical Survey of India
FOR
1947-48

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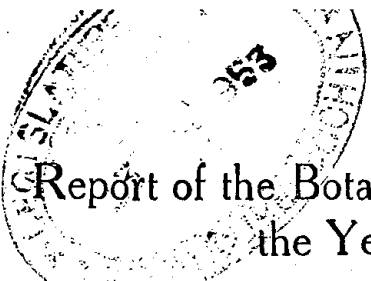
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Report of the Botanical Survey of India for the Year 1947-48.

1. **Staff.**—The entertainment of the second batch of trainees in Taxonomy and Systematic Botany consisting of (1) Janab Bazli Ali, (2) Shri S. K. Chowdhury, (3) Sri M. L. Banerjee, (4) Sri P. V. Bole, (5) Sri Surendra Singh and (6), Sri M. A. Sampatkumaran from July, 1947 further accelerated the activities of the Botanical Survey. But in the first batch, two of the trainees, namely, Dilayar Hussain and Sri J. Mitra discontinued their studies in the Training Scheme under unforeseen circumstances, the former being forced to go, to West Pakistan from his home in East Punjab and the latter declining to continue the course from January, 1948 due to nervous break-down. Sri V. Narayanaswami in addition to his duties as assistant for systematic work and part time Instructor of the trainees, held charge of the post of the Curator of the Herbarium under the Government of West Bengal from the afternoon of the 6th February, 1948. Sri N. P. Chowdhury continued as full-time Instructor of the Training Scheme.

2. **Tours.**—(a) The following tours were undertaken during the year:—

- (i) Study tour to the Chota-Nagpur Hill tracts of the Singhbhum and Ranchi districts by the first batch of trainees led by Sri N. P. Chowdhury, 277 specimens were collected in this excursion.
 - (ii) Exploration of the Changu valley in the Sikkim Himalaya as far as the Nathula. (The party consisted of the trainees of the first batch numbering five was led by the Superintendent. The following places were visited namely Gangtok, Korponang Changu, Nathula, Sureil and Mungpo. About 2000 specimens were collected which included living and herbarium specimens of Rhododendrons, Primulas, Corydalis, Anemones, Abies, Juniperus and other alpires).
 - (iii) Bolepur and Santi Niketan and the surrounding country by the first batch of trainees led by Sri Jogindra Nath Nasker, one of the herbarium assistants. About 50 specimens including *Drosera Burmanni* and *Utricularia flexuosa*—two of the insectivorous plants, were collected. Their studies were mainly confined to the ground vegetation which plays important role in the problem of soil conservation.
 - (iv) Jasidih, Trikut hills, Pareshnath hills, Topchanchi lake and hills, all in the East part of Bihar were visited by the second batch led by the writer. 500 specimens were brought in. Attention was focussed to the relic vegetation of the plant families at a height of about 4,500 ft. bearing remarkable affinity to the flora of the Darjeeling district at similar elevation.
 - (v) Asansol and the neighbouring villages in the Burdwan district led by Sri N. P. Chowdhury. 60 specimens were collected.
 - (vi) Gopalpur-on-sea, Barkuda, Oheriakuda and Goppa Kuda Islands in the south-west corner of the Chilka Lake, the hills of Keshapore and Kallikota on the mainland and the Eastern ghat ranges near Taptapani near Berhampore were studied. The trainees were led by Sri V. Narayana swami 500 specimen were collected.
- (b) Sri V. Narayanaswami, the assistant for Systematic work and the writer attended the Patna Session of the Indian Science Congress Association held in the first week of January, 1948. The following papers were read

before the Congress namely—(1) The preliminary account of the Indo-Burmese species of *Grewia* by Narayanaswami and Rolla Seshagiri Rao (Trainee). (2) The confusion in the systematic position of some of the Indian Rhododendrons by Kalipada Biswas and Rolla Seshagiri Rao, (3) Distribution of Indian Lichens by Kalipada Biswas and Dharani Dhar Awasthi, (4) Revision of Indian *Trapas* by Kalipada Biswas and Jyotirmoy Mitra, (5) Indian Sphagnums and (6) Indian species of *Sargassums* by Kalipada Biswas and Arun Kumar Sharma. Besides the above Mr. Narayanaswami read a paper on the Role of Botany in Pharmaceutics before the All India Pharmaceutical Conference held during the Science Congress Session.

3. **Workers and Visitors in the Herbarium:**—(a) The herbarium and the library was visited by a number of people for consultation and study. They were Messrs. N. K. Sen of the Presidency College, Calcutta; Kunja Behari Lal Sarma and Banshi Dhar Sarma of the Jaipur City Agricultural Department, Shyam Shankar Bhattacharya, D.V.R. Chatterjee, V.K. Chatterjee, A. K. Bose, S. S. Ghosh of the Forest Research Institute and J. P. Srivastava, Lecturer in Geology, Lucknow University.

(b) The following visitors came to the herbarium and the library in connection with various missions.

Mr. S. K. Dey, I.C.S., Secretary to the Department of Agriculture Forest and Fisheries, Government of West Bengal, discussed the question of the transfer of the Herbarium and the Garden to the control of the Government of India and P. M. Das Gupta, the Deputy Secretary of the same department also visited the Herbarium for the same purpose. Toshituro Morinaga, Director of Empire Agriculture Station, Tokyo, the well-known rice expert examined the sheets of wild Indian species of rice. The other distinguished visitors are:—

M. G. Provence, French Trade Commissioner; U. Tin, Agricultural Statistician, Burma; U. M. and E. A. Palmer of Butler University, U. S. A., Gladys Elphick of New Zealand, Swami Avyaktananda, Chairman, Indo-British Goodwill Mission; Miss L. Reckett, (God-Child of late Sir David Prain), Charles Gratrey, Tower House, Calcutta—(regarding investigation of essential oils); S. Y. Padmanabhan, Mycologist, C. R. R. Institute, Cuttack; Vyvyen Jenkin, Secretary, Indo-British Goodwill and Cultural Mission; Brahmachari Asokachaitanya, Librarian, Ramkrishna Ashrama, Midnapore; R. O. Lacy with botany students of Science College, Patna; O. R. Narasimhan (Government House), Calcutta; Son of H. E. The Governor of West Bengal; O. R. Indira Gandhi Government House, Calcutta (Grand daughter of H. E.); R. Misra, Head of the Department of Botany, University of Saugar; K. S. Ranganathan, Head of the Department of Botany, Government College of Indian Medicine, Madras; F. Joseph Pallithanam, S.J. St. Mary's College, Kurseong; Victor Cofman, and Lucy M. Cofman of London on study mission to India; R. N. Suri and a party of 20 students of the Indian Forest College, New Forest, Dehra Dun; V. Seas, Forest Utilisation Officer, West Bengal; M. Chakrabotry and Goswami and A. K. Banerjee visited the Herbarium twice with a batch of 10 and 120 students; M. L. Devender Singh, Capt., A. D. C to H. E. Sri Rajagopalachari; Sverre Peterson, Oslo, Norway, Meteorologist; S. K. Banerjee, Director-General of Observatories New Delhi, O. R. Krishnaswami, son of H. E. The Governor of West Bengal; H. Bhattacharjee, A. D. O.; P. C. Mahajan, C. R. I. R., New Delhi; Swami Shiddananda, Ram Krishna Mission, Belurmath.

Special mention may be made of the following Australian delegates to the Indian Science Congress who paid a visit to the Herbarium of the Garden:—

P. G. Madsen, University Sydney; N. S. W. Austr., Kerr Grant, University of Adelaide, South Austr. J. A. Prescott, Waite, Arberatum Adelaide; Guy Bresford, O. S. I. R, Melbourne, Australia; R. Grenfell Thomas, Melbourne, Australia.

Dr. Ibrahim Kadry Bay, Under Secretary of State for Agriculture of Egypt, Cairo, also visited the herbarium and discussed with the writer regarding possibilities of exchanging herbarium specimens, living plants and publications with the botanical and Agricultural institutions of his country.

4. **Systematic.**—7,817 specimens have been identified during the year. Out of these 1,004 specimens came from numerous extra departmental correspondents, the chief among such beneficiaries being Rev. J. O. Bressers, Ranchi; R. Misra, University of Saugar, O. P.; Rev. J. O. Culshaw, Bankura; Prof. of Botany, Agricultural College, Lyalpore; Entomologist-in-charge, Icirya Purchase Control Scheme, Bangalore; Government Lecturing and Systematic Botanist, Agricultural College, Oombatore; Silviculturist and Botanical Forest Officer, Shillong; A. C. Dutta of Cotton College, Gauhati; M. B. Raizida of the Forest Research Institute, Dehra Dun; Economic-Botanist, Government of Bombay, Poona; S. C. Mustafa of Shillong; A. Sanyal, D. F. O, Chaibasa, Bihar and Prof. K. N. Kaul, Agricultural College, Kanpur. The balance consisted partly of the materials of Grewia and Chonemarpa of the Calcutta, Dehra Dun, Shillong and Oombatore Herbariums and partly of the collections brought from the explorations in the Rampa and Vizigapatan Agency tracts, Chota Nagpur hills, Sikkim Himalaya, Ranjit area in Patna, Southal Parganas and Paresnath Hill. The Herbarium staff consisting of the Curator of the Herbarium, Systematic Assistant and the trainees in the New Scheme participated in this work. The examination of the collections brought from the little explored region of the Rampa country which was briefly referred to in my last report have now yielded some interesting results in the discovery of a several new records of plants belonging to such distant regions like the Himalayas, Assam, Burma and the Andamans in the Bay of Bengal. The new records which are additions to the published flora of Madras are the following :—

Hypserpa cuspidata (Wall) Miers (*Limacia cuspidata* H. F. and T.). (Menisp). *Cochlospermum religiosum* Alston. *Paramignya scandens* Craib. (Assam); *Zizyphus glabra* Roxb. (Burma and Andaman) *Pygeisum acuminatum* Colebr., *Bupleurum mucronatum* W. & A. *Pimpinella Heyneanum* Wall. var. *typicum* C.B.C.; *Wendlandia exserta*, D.C., *Psychotria fulva* Ham; *Linnociera malabarica* Wall. *Balanophora Indica*. Wall, *Balanophora dioica* Brown, *Glochidion Assamicum* Roxb, *Curculigo recurvata* *Ophiopogon intermedium* D. Don, *Flagellaria indica*, *Luisa albens* Trin, *Microstegium monanthum* (Nees) A. Camus, *Alectra indica* Benth, *A Thomsoni* H F., *Hibiscus pungens* Roxb, *Epithema carnosum* Benth; *Smilax prolifera*, *Vitex peduncularis* Wall. var. *Roxburghiana*.

These discoveries from this part of the country confirm the belief that there are still vast tracts of India requiring even preliminary exploration and that the knowledge of the Indian flora is far from complete. It has a store of many unknown plants besides newer localities at different places, unconnected with the original habitats for a large number of known plants. A very interesting instance of extended range of distribution of a very effective medicinal plant is that of *Vitex peduncularis* var. *Roxburghiana* of Assam, which is an acknowledged specific for the black water fever. This was collected from the slopes of Dumma Konda hill. So also *Dichroa febrifuga* of the Sikkim Himalaya can very well be considered a substitute for quinine Mahonia and *Berberis* species from which "Berberidin" has recently been isolated are considered to be efficacious in diabetes. Such discoveries have established the universal truth that remedies for the ills of huminity exist

in many parts of India and in some cases they occur in places where the disease itself occurs. Only human ingenuity, diligent search and enquiry will bring to light these hidden remedies in the vegetable wealth of our country. 141 specimens from the moss collections of this herbarium were sent to Mr. Edwin B. Bartram of Baskill, Piki country, Pennsylvania for checking our determinations. They were received back after confirmation. Identification of 60 cryptogamic specimens were also worked out.

8,267 sheets were incorporated into the Herbarium, the major portion was part of the Great Wallichian collection which were isolated from the general collections for safe custody in the Herbarium of the Lloyd Botanic Garden, Darjeeling during the war. 5,566 sheets were repaired, 2,129 sheets mounted and 1138 species and genus folders were renewed and re-written. Two sheets of *Mansonia Dipikae* De. presented by the Silviculturist and Botanical Forest Officer, Shillong; two sheets of *Alteranthera pungens* H.B.K. presented by Prof. D'Almedia and one sheet of *Trapa maximoviczii* presented by Dr. Bidl of V. L. Komarov Botanical Institute of the Academy of U.S.S.R. were new additions to the Herbarium. Our thanks are due to all these donors particularly the latter for his gift of the cotype. 2 sheets of *Bucklandia populnea* Bl. were presented to the Botanical Institute of the Sun-Yet-Sen University, China. 52 sheets of *Flemingia* borrowed for work from the Department of Biology, St. Xavier's College, Bombay were returned.

The work of stamping these valuable botanical collections with the specially prepared rubber-stamp having the insignia "Herbarium Royal Botanic Garden, Calcutta" and numbering them serially, beginning with the first family Ranunculaceae in the Bentham and Hooker's System of classification which is being followed in this Herbarium, has been renewed after a long time. 8,500 sheets were thus numbered, taking this work to the end of the Ranunculaceae alone at the end of the year. This work is a preliminary to the subsequent task of ledgering as far as possible all the authentic sheets of the herbarium, when sufficient staff will, it is hoped, become available in near future.

The cataloguing of the sheets in the several local herbaria, namely, those of N. W. Himalaya, Upper Gangetic Plain, Madras (includes Bombay also), Bengal, Eastern Himalaya, Assam and Burma was also taken up with the help of the trainees. The cryptogamic collections of algae, mosses, lichens, and fungi, which were in an unsatisfactory condition in a portion of the herbarium for want of sufficient staff to attend to them, have now been sorted, classified and re-arranged with new folders and labels as far as possible and thus they have been brought up to a fair state of preservation, suitable for consultation.

In connection with the putting up of an exhibition of important medicinal plants of British and Indian Pharmacopoeias at the All India Exhibition, Eden Garden, Calcutta, an annotated list of Indian and other medicinal plants classified according to their therapeutical values, like aperients, anthelmintics, biters, Cholagogues, demulcents, diuretics, emetics, expectorants, purgatives, sialagogues, Stomachics, tonics, etc, was prepared. Descriptive sign-boards, plant name plates, wall posters of noteworthy plants like the *Nepenthes* (pitcher plant), *Rafflesia* sp. (with the biggest angiospermous flower), *Drosera* and *Dionaea* (the Sun-dews) and the Venus fly-trap (both insectivorous plants), and Coloured drawings of the Himalayan *Rhododendrons* were all arranged as an attractive background for the living plant exhibits.

378 sheets of *Poa*, one sheet of *Sporobolus*, 11 sheets of *Sophora*, one sheet of *Gomphrena decumbens*, two sheets of *Buonymus Kachinensis*, and 36 sheets of Sir Percy Cox's collections from Persia were sent out on loan to Dr. N. L. Bor, Asst. Director, Kew, Mr. P. Teoong and Director Kew, respectively. 300 sheets of grasses of Burma, deposited in this herbarium for safe custody

by Mr. D. Rhind of Burma, were transferred to Mr. Rhind at Kew, in connection with his work on the grasses of Burma. One sheet of *Elsholtzia communis* and 1150 sheets of *Grewia* were received on loan for research work in this herbarium from Kew and Coimbatore respectively. 27 sheets of *Crocus* were returned by Mr. M. B. Raizada, who had them on loan for work.

200 named duplicate sheets of the collections from Orissa were presented on exchange basis to Mr. F. L. Bennett, Biology Department, Black Hills, Teacher's College, Spearfish, South Dakota, U. S. A. 200 named duplicates of the Sikkim Himalayan collections were presented to the Botany Department of P. R. College, Cocanada for teaching purposes. 551 well-preserved and named herbarium specimens were received as part of exchange obligations from Th. Arwidson, Curator, Naturhistoriske, Rikensburet, Botaniska Arduingan, Stockholm 50. The Botanical Forest Officer, Shillong, presented to the herbarium two sheets of *Mansonia Dipikae*; Capt. Kingdon Ward presented to this herbarium some of specimens collected by him in the Khasi Hills. Prof. K. N. Kaul of the Government Agricultural College, Kanpur, forwarded 9 sheets of plant specimens as gift to the Herbarium. Some lowering specimens of *Costus speciosus*, the kut, were received from the Botanical Forest Officer, Shillong for purposes of trial cultivation in the garden. 50 duplicate sheets were supplied to Dr. Misra of the Saugor University, O. P. These sheets belonged to the collections from Mymensingh. A dozen seeds of *Hevea brasiliensis* Muell. the para rubber tree were transferred to the Royal Botanic Garden, for cultivation by the Curator of the Industrial Section, Indian Museum, Calcutta.

5. **Supplies of Plants, Seeds and Scientific and Economic Informations.**—(a) James Boyle of country Mayo of Eire was furnished with a list of Indian plants suitable for cultivation in Eire and arrangements made with his Curator, Lloyd Botanic Garden, Darjeeling for the supply of seeds of the plants, selected. Arrangements to secure supplies of oil seeds of the Indian species of the family Rosaceae and Boraginaceae for sub-professor, A. A. Pristupa of Rustov on Don, Pedagogic Institute, Russia were made. Lt. Col Pollitt of S. Rhodesia was brought in contact with the source of supply of the Patchouli plant and its seeds for cultivation in S. Rhodesia.

(b) The usual service of this department as a bureau of information of scientific and economic information to a large clientele in India and abroad was regularly maintained. Some of the more important items of work, which fall into this category, include the following. B. A. Krukoff of the New York Botanic Garden was furnished with the probable sources of supply of some cultures of the fungus, causing cotton-boll shedding disease in India. S. Rao, Assistant Editor of the office of the Dictionary of raw products, Delhi was assisted in his nomenclatural difficulties. The botanical names brought by him, were revised for him as per the latest rules of botanical nomenclature. J. P. Correa of the same office was supplied with fac-simile drawing of *Nardostachys jatamansi*. The Director of Inspection, Government of India, Food Department was helped in the isolation and identification of the seed impurities found in the wheat consignments, imported from Turkey and Europe. Opinion was offered as to the alleged poisonous properties of such mixtures in the imported wheat. Y. Sundara Rao of Waltair was supplied with the correct and revised names for the Indian species of *Sesbania* sp. and also supplied him with the seeds of as many species as could be procured. L. Maher of St. Vincent's School, Asansol was informed of the name of the plant, known as the 'Flame of the forest,' namely, *Butsa monosperma*. The doubt regarding nomenclature of *Acacia Farnesiana* and *Vauchella Farnesiana* was cleared for the assistant of the Dictionary of the Raw Products. Information was supplied to the Silviculturist, Forest Research Institute, Dehra Dun, regarding the seeds of *Araucaria Cunninghamii* and *A. Bidwillii*. Supply

of seeds of those 2 species was also arranged for him. Besides identifying 2 plant parasites for the Mycologist, Quetta, Baluchistan, he was also furnished with the relevant information on them as called for. The Director of Industries, C. P. Government was supplied with notes on the Babassu oil-nut palm and their availability. Notes on shade plants for Coffee were given to R. Pellow, Pomologist and horticulturist, Calcutta. Enquiry about the Balsawood by the Botanist, Experimental Station, Toklai, Cinnemara, Assam was answered suitably. A note on the cultivation of medicinal plants in Bengal for the Government of Bengal was supplied to them at their request. Similar note on the possibilities of such a scheme operating throughout India was also supplied to the Secretary, Indian Council of Agricultural Research, New Delhi; Narayan Row, Assistant Fruit Specialist, Coonoor, was assisted in his attempt to obtain seeds of medicinal plants for cultivation on the Nilgiris. Y. S. Rao of Waltair, was supplied with the authors and references for *Sesbania Roxburghii* and *Sesbania uliginosa*. Popular descriptions of *Ficus bengalensis* and *F. religiosa* and other informations on Indian trees were furnished to H. B. Binny of Victoria, Canada, in connection with his intended publication on 'trees'. Photographs of some of the well known trees were also supplied to him. Relevant information on the exaggerated reports about the Simul tree of India, *Salmalia malabarica* and the alleged illuminated trees of India were sent to him. Prof. F. R. Barucha of the Royal Institute of Science, Bombay was given the correct name of *Bombax malabaricum* and the relevant literature relating to the changed nomenclature. The distribution of *Aralia pseudo-ginseng* Btt., the wonderful medicine of China was intimated to Maneckji of Calcutta. A scheme for the establishment of a botanical garden in Delhi was prepared by the writer and submitted to the Government of India at their request. Bhattacharjee, the Horticultural Officer, Assam was rendered necessary assistance in his work of examining the sheets of *Citrus* in the Herbarium. A supplementary note to the centenary volume of the Royal Botanic Garden was prepared in the light of the original letters of Sir Joseph Banks, connected with the establishment of the Garden. The special officer, Potatoes, West Bengal was supplied with information on *Stictocardia tiliaefolia*. M. F. Chandraratna, Botanist, Agricultural Department, Peraduniya, Ceylon was furnished with information on the habitat, culture and dimensions of *Derris rebusta*; Prof. A. Das Gupta, Botany Department, Bangabasi College, Calcutta, was furnished with information about the family name and the poisonous properties of *Antiaris rufa* and *A. Toxicaria*. A list of literature on ornamental plants of India was sent out to G. D. Meninger of Los Angeles, California. The habitat of *Hyoscyamus muticus* and *H. reticulatus* was given to Prof. Quazilbash of Peshawar. The chief points of distribution between them were also pointed out to him. The distribution of *Psilotum triquetrum* was supplied to B. Sundara Rao of the Andhra University, Waltair. Dr. K. Ramiah, Director, Central Rice Research Institute, Outtack was given necessary hints as to how to prepare handy plant presses—with ply-wood or light strong wood. H. F. Mooney, the Forest Advisor, Sambalpur was supplied with descriptions of *Aleurites Fordii* and *A. montana*. Correct names of some other plants, references to literature, dates of publications of some book etc. Author's names and relevant literature on 2 species of *Desmodium* were given to the Assistant Economic Botanist, Bombay.

A. Majeed, Reader, S. E. College, Bahawalpore was furnished with the names of 16 ferns common in the Punjab. Mrs. Mildred Archer, Deputy Commissioner's Bungalow, Naga hills, Assam was informed about the paintings of plants at the time of the East India Company. T. Basu of Calcutta received the names of plants suitable for removing the smell of trenching ground. T. S. Chauhan was suggested the ways and means to eradicate *Flacourtia Ramontchi*—'Kakai'. Information on the cultivation of white mush was given to R. H. Saksena, Landlord and Contractor, Hawa

Mahal, Bhopal. Birla Jute Manufacturing Co. of Calcutta was furnished with information on cork-yielding plants of India. Georges minacoulis invention exploitation, des Brevets d' Invention Rue-Zaher and tew-fiek, Port-said, Egypt was enlightened about the alleged specific for tuberculosis namely, "Umkaloabo" said to have been prepared from a south African plant, belonging to the family Polygonaceae. The literature relating to this, issued by the manufacturing firm does not mention the source of this drug. Economic Botanist, West Bengal, Chinsurah was furnished with the distribution of *Urtica dioica*, *U. urena* and *U. pilulifera*. Prof. R. L. Nirula of the Nagpur Science College was given the points of distinction between *Rungia repens* and *R. Elegans*. Information relating to the cultivation and commercial varieties of the Palmarosa grass, *Cymbopogon Martini*, Vice-principal, Ramsaday College, Amta, Howrah, got the botanical names for Vernacular names of nine plants. The sources of supply of 12 Indian drugs were furnished to the Dy. Director of Health Services, West Bengal. B. L. Manjunath had the relevant information supplied to him, relating to *Cymbopogon*, *Berberis* and Algae of economic value for his Dictionary of Raw Products of India. J. N. Sen Gupta, D. F. O., Darjeeling was furnished with information about "Somarasa" or 'Somalata'.

6. **Roxburgh's Icones.**—Strenuous endeavours were made to enlist the co-operation of well-known philanthropic scientific trusts in India and America for getting the valuable illustrations of Indian plants known as "Roxburgh's Icones" numbering nearly 2,350 printed, thereby lifting these irreplaceable coloured original drawings from oblivion in which they have remained from 1793. The times have not proved propitious for such co-operation so far.

7. **Reviews and Publications.**—The following reviews were sent out for publication, namely—(1) Journal of the British Grassland Society, Vol. I, No. 1, for the Editor of the journal of scientific Research in India, done by Dr. K. Biswas and M. A. Sampathkumaran, (2) Review of the "Regional keys for the identification of the important Timbers" by K. A. Chowdhury of the Forest Research Institute, Dehra Dun, done by Biswas and Sampathkumaran, sent to Science and Culture, (3) Review of the article "India and Kew" by D. Chatterjee done by V. Narayanaswami and published in Science and Culture. Dr. S. K. Mukherjee, Curator of the Herbarium contributed 2 articles, one on *Berberis* spp. and the other on *Mahonia* Sp. to the Dictionary of Raw Products of India. The Superintendent contributed an article on "Algae" for the same Dictionary. The Superintendent contributed these articles and notes for publication during the year:— "Bharatiya Sampad" in the Agricultural Journal of the Govt. of W. Bengal, "Romance of Flowers" published in the Puja Number of the Hindusthan Standard; Prospects of India Rubber and Para Rubber, for publication in Journ. Ind. Coun. Agri. Res., "Economic uses of Indian Lichen" in the same journal, now in the press "Studies in Tung Oil yielding trees in India" published in the journal of the Royal Asiatic Society of Bengal; the Flora of the University Science College compound and garden in 1922, compared in the Jour. Bot. Soc. Bengali; Lichen Flora of India in the Journ. Roy. Asiat. Soc. passing through the press; "Bharatiya Banaushadi Parichaya" passing through the press. Atom Bomb Experiment in the Pacific Ocean and its possible effect on the marine life forms of the Indian Ocean, published in Science and Culture and Science and Scientists in the Netherland Indies—, Review. A comment relating to nomenclature on Mr. McCann's proper "Ceropegia" was published by R. S. Rao, one of the Trainees in the Journal of the Bombay Natural History Society. A botanical tour in Chota-Nagpur, was published by S. K. Mukherjee, Curator of the Herbarium, in the Bulletin of the Botanical Society of Bengal.

8. **Review of Progress of Botanical Studies in India.**—Though the World War II came to an end in the autumn of 1945 still the botanical institutions in Europe and especially in England have not yet fully revived to the pre-war level of efficiency and activity. Journals like the Journal of Botany and Kew Bulletin which usually dealt with the Systematic Botany of India have not started to come out. But a fairly large number of journals from India, the Far Eastern Asia and America has come out, embodying much useful information on Indian plants. In a measure they compensate the paucity of matter, emanating from usual sources like Kew and Edinburgh. A review of the contributions to the botany of India has been a regular feature of this report.

Nearly two hundred and eleven articles having more or less some bearing on Indian Plants were issued during the year under report. They cover such subjects like Algae, Cytology, Anatomy, Fungi, Ferns, Embryology, Ecology, Fossils, Morphology, Economic Botany, Physiology, Systematic Botany, Teratology and plant distribution. There were 55 papers on Systematic Botany alone.

Uronema Terrestris A. K. Mitra is a new alga described by Mr. Mitra. It appeared in cultures of soils from rice fields near Allahabad. *Hemrardia* is a new species of grasses described for Afghanistan and Baluchistan and India by C. E. Hubbard and N. L. Bor respectively from Kew. Dr. Heurard has described a new combination and a new species of grasses in his 'notes on the nomenclature of some grasses', published in Blumea, during the war period. They are *Lasiurus Scindicus* Honer nov.—sp. from Sind and *Chrysopogon nodulibarbis* (Hochst). Henr. nonc. comb. Van Oostroom, has the following new species in his paper on 'the Asiatic species of *Neuropeltis* Wall. namely *N. Malabarica* Van Oostroom. He has also described in full the following species, *N. Ovata* Wall, cat. N. 1323 (Nomen) and *N. Bracteata* Griff. 'The British Indian species of *Viscum* revised and compared with those of S. E. Asia, Malaysia and Australia' by B. H. Danser published in Blumea Vol. IV, No. 2 (1941), contains revisions of the nomenclature of all the Indian *Viscums*. In 'the Phillipine plants used for Arrow and fish poisons' by Eduardo Quisumbing, a number of species common to India has also been mentioned.

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of seeds of those 2 species was also arranged for him. Besides identifying 2 plant parasites for the Mycologist, Quetta, Baluchistan, he was also furnished with the relevant information on them as called for. The Director of Industries, C. P. Government was supplied with notes on the Babasu oil-nut palm and their availability. Notes on shade plants for Coffee were given to R. Pellow, Pomologist and horticulturist, Calcutta. Enquiry about the Balsawood by the Botanist, Experimental Station, Toklai, Cinnemara, Assam was answered suitably. A note on the cultivation of medicinal plants in Bengal for the Government of Bengal was supplied to them at their request. Similar note on the possibilities of such a scheme operating throughout India was also supplied to the Secretary, Indian Council of Agricultural Research, New Delhi; Narayan Row, Assistant Fruit Specialist, Coonoor, was assisted in his attempt to obtain seeds of medicinal plants for cultivation on the Nilgiris. Y. S. Rao of Waltair, was supplied with the authors and references for *Sesbania Roxburghii* and *Sesbania uliginosa*. Popular descriptions of *Ficus bengalensis* and *F. religiosa* and other informations on Indian trees were furnished to H. B. Binny of Victoria, Canada, in connection with his intended publication on 'trees'. Photographs of some of the well known trees were also supplied to him. Relevant information on the exaggerated reports about the Simul tree of India, *Saimalia malabarica* and the alleged illuminated trees of India were sent to him. Prof. F. R. Barucha of the Royal Institute of Science, Bombay was given the correct name of *Bombax malabaricum* and the relevant literature relating to the changed nomenclature. The distribution of *Aralia pseudo-ginseng* Btt., the wonderful medicine of China was intimated to Maneckji of Calcutta. A scheme for the establishment of a botanical garden in Delhi was prepared by the writer and submitted to the Government of India at their request. Bhattacharjee, the Horticultural Officer, Assam was rendered necessary assistance in his work of examining the sheets of *Citrus* in the Herbarium. A supplementary note to the centenary volume of the Royal Botanic Garden was prepared in the light of the original letters of Sir Joseph Banks, connected with the establishment of the Garden. The special officer, Potatoes, West Bengal was supplied with information on *Stictocardia tiliifolia*. M. F. Chaudraratna, Botanist, Agricultural Department, Peradiniya, Ceylon was furnished with information on the habitat, culture and dimensions of *Derris rebusta*; Prof. A. Das Gupta, Botany Department, Bangabasi College, Calcutta, was furnished with information about the family name and the poisonous properties of *Antiaris rufa* and *A. Toxicaria*. A list of literature on ornamental plants of India was sent out to G. D. Meninger of Los Angeles, California. The habitat of *Hyoscyamus muticus* and *H. reticulatus* was given to Prof. Quazilbash of Peshawar. The chief points of distribution between them were also pointed out to him. The distribution of *Psilotum triquetrum* was supplied to B. Sundara Rao of the Andhra University, Waltair. Dr. K. Ramiah, Director, Central Rice Research Institute, Cuttack was given necessary hints as to how to prepare handy plant presses with ply-wood or light strong wood. H. F. Mooney, the Forest Advisor, Sambalpur was supplied with descriptions of *Aleurites Fordii* and *A. montana*. Correct names of some other plants, references to literature, dates of publications of some book etc. Author's names and relevant literature on 2 species of *Desmodium* were given to the Assistant Economic Botanist, Bombay.

A. Majeed, Reader, S. E. Collage, Bahawalpore was furnished with the names of 16 ferns common in the Punjab. Mrs. Mildred Archer, Deputy Commissioner's Bungalow, Naga hills, Assam was informed about the paintings of plants at the time of the East India Company. T. Basu of Calcutta received the names of plants suitable for removing the smell of trenching ground. T. S. Chauhan was suggested the ways and means to eradicate *Flacourtia Ramontchi*--'Kakai'. Information on the cultivation of white mush was given to R. H. Saksena, Landlord and Contractor, Hawa

Mahal, Bhopal. Birla Jute Manufacturing Co. of Calcutta was furnished with information on cork-yielding plants of India. Georgas minacoulis invention exploitation, des Brevets d' Inventions Rue-Zaher and tew-fiek, Port-said, Egypt was enlightened about the alleged specific for tuberculosis namely, "Umkalobo" said to have been prepared from a south African plant, belonging to the family Polygonaceae. The literature relating to this, issued by the manufacturing firm does not mention the source of this drug. Economic Botanist, West Bengal, Ohinsurah was furnished with the distribution of *Urtica dioica*, *U. urena* and *U. pilulifera*. Prof. R. L. Nirula of the Nagpur Science College was given the points of distinction between *Rungia repens* and *R. Elegans*. Information relating to the cultivation and commercial varieties of the Palmarosa grass, *Cymbopogon Martini*, Vice-principal, Ramsaday College, Amta, Howrah, got the botanical names for Vernacular names of nine plants. The sources of supply of 12 Indian drugs were furnished to the Dy. Director of Health Services, West Bengal. B. L. Manjunath had the relevant information supplied to him, relating to *Cymbopogon*, *Berberis* and *Algae* of economic value for his Dictionary of Raw Products of India. J. N. Sen Gupta, D. F. O., Darjeeling was furnished with information about "Somarasa" or 'Somalata'.

6. **Roxburgh's Icones.**—Strenuous endeavours were made to enlist the co-operation of well-known philanthropic scientific trusts in India and America for getting the valuable illustrations of Indian plants known as "Roxburgh's Icones" numbering nearly 2,350 printed, thereby lifting these irreplaceable coloured original drawings from oblivion in which they have remained from 1793. The times have not proved propitious for such co-operation so far.

7. **Reviews and Publications.**—The following reviews were sent out for publication, namely—(1) Journal of the British Grassland Society, Vol. I, No. 1, for the Editor of the journal of scientific Research in India, done by Dr. K. Biswas and M. A. Sampathkumaran, (2) Review of the "Regional keys for the identification of the important Timbers" by K. A. Chowdhury of the Forest Research Institute, Dehra Dun, done by Biswas and Sampathkumaran, sent to Science and Culture, (3) Review of the article "India and Kew" by D. Chatterjee done by V. Narayanaswami and published in Science and Culture. Dr. S. K. Mukherjee, Curator of the Herbarium contributed 2 articles, one on *Berberis* spp. and the other on *Mahonia* Sp. to the Dictionary of Raw Products of India. The Superintendent contributed an article on "Algae" for the same Dictionary. The Superintendent contributed these articles and notes for publication during the year:— "Bharatiya Sampad" in the Agricultural Journal of the Govt. of W. Bengal, "Romance of Flowers" published in the Puja Number of the Hindusthan Standard; Prospects of India Rubber and Para Rubber, for publication in Journ. Ind. Coun. Agri. Res., "Economic uses of Indian Lichen" in the same journal, now in the press "Studies in Tung Oil yielding trees in India" published in the journal of the Royal Asiatic Society of Bengal; the Flora of the University Science College compound and garden in 1922, compared in the Jour. Bot. Soc. Bengali; Lichen Flora of India in the Journ. Roy. Asiat. Soc. passing through the press; "Bharatiya Banaushadi Parichaya" passing through the press. Atom Bomb Experiment in the Pacific Ocean and its possible effect on the marine life forms of the Indian Ocean, published in Science and Culture and Science and Scientists in the Netherland Indies—1 Review. A comment relating to nomenclature on Mr. McCann's proper "Ceropegia" was published by R. S. Rao, one of the Trainees in the Journal of the Bombay Natural History Society. A botanical tour in Chota-Nagpur, was published by S. K. Mukherjee, Curator of the Herbarium, in the Bulletin of the Botanical Society of Bengal.

8. **Review of Progress of Botanical Studies in India.**—Though the World War II came to an end in the autumn of 1915 still the botanical institutions in Europe and especially in England have not yet fully revived to the pre-war level of efficiency and activity. Journals like the Journal of Botany and Kew Bulletin which usually dealt with the Systematic Botany of India have not started to come out. But a fairly large number of journals from India, the Far Eastern Asia and America has come out, embodying much useful information on Indian plants. In a measure they compensate the paucity of matter, emanating from usual sources like Kew and Edinburgh. A review of the contributions to the botany of India has been a regular feature of this report.

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the destruction caused by these insects is much greater in warm humid tropics than in cooler regions. He has stated that the use of repellants and bug traps after a thorough fumigation have been found economic and effective.

In the Ceylon journal of Science, V. J. Chapman has described a new species of *Nepenthes*, *N. Zeylanica* sp. nov. which is said to be endemic to Ceylon. The contributions to the fern literature of India are (1) Harada (K. L.) Kapoor (L. D) and Chopra (J. O)'s 'Male Ferns of Kashmir,' (2) Notes on the Ferns and Ferns allies of Murree Hill by Abdul Hameed (3) 'On natural classification of the family Polypodiaceae' and (4) on 'the genus *Gleichenia* Smith' by R. O. Ching. In the first paper, the authors have shown that the male Fern extract of B. P. and U. S. P. standard for medicinal purposes is yielded by *Dryopteris odontoloma* (Moore) C. Chr. and *D. marginata* (Wall) Ohoist. This medicine is now being imported from abroad, as the male-fern *D. Filixmas* L does not occur in India according to the latest declarations by R. O. Ching. R. O. Ching has discussed the heterogenous nature of the Polypodiaceae and has proposed splitting it up into 33 smaller families. The fern species of India are bound to be affected for nomenclature in accordance with these changes. In this article 'on the genus *Gleichenia* Smith', he has dealt with the taxonomy of the genus and is of opinion that in case *Gleichenia* Am. is rendered invalid, as it should be, unless conserved at the next International Botanical Congress, it will naturally follow that the family *Gleicheniaceae* Kunze should be substituted by *Dicranopteridaceae*, according to the rules of botanical nomenclature. The genera comprising this family are shown to be very distinct from each other not only in morphological and anatomical characters, but also from their habitat, as each appears to be confined to definite geographical centre.

'A taxonomic Revision of *Podocarpus*' by Buchholz (J. J.) and Gray (Netta E) deal with the geographical distribution of the genus in India and elsewhere. From the Lucknow centre of fossil Botany and also from Calcutta 5 papers on the fossil flora of India have been issued. 'The occurrence of Microflora in the salt Pseudomorpha beds, Salt Range' by A. K. Ghose and A. Bose; 'Some Fossil leaves of *Mallotus philippinensis*', the occurrence of a Tropical fig in Kashmir; some fossil leaves and fruits of the common Himalayan Ivy (*Hedera Helix* L.) from pleistocene of Kashmir and 'some fossil leaves of *Berberis* from Kashmir', all the four by J. S. Puri show that interest in this direction is also receiving due attention.

Ernest Brown Babcock had published after a strenuous research spread over more than twenty-five years a very exhaustive and comprehensive monograph of the genus *Crepis* in the world. It is in two parts dealing with the taxonomy, Phylogeny, Distribution and Evolution of *Crepis* and part 2 deals with the systematic treatment of the genus. The work is fully illustrated and has special features; these items of information, namely distribution maps, and relationships, where the author has given the cytology of the species discussed. The publisher, namely University of California and the California Agricultural Experiment Station, who encouraged the work by allocating funds annually for the maintenance of the project are to be congratulated. The author remarks at the beginning of the work 'this continuous support of fundamental research on a group of noneconomic plants throughout a period of twenty-five years by an agricultural Institution reveals a far-sighted policy on the part of the administration of the California Experimental Station. It is the hope of the author that the results of these investigations as summarized in this monograph will be found to justify such a policy. The

following new species and combinations for India are described by the author in the monograph :—

O. nana typica Sub sp. nov. (Kashmir), *O. Thomsonii* Babo., *O. multicaulis genuina* (Regl.) Babo., *O. multicaulis* (Regl.) Babo., *S. Sancta* (L.) Babo., and *C. sancta bifida* (Vis.) Thell=*Pterotheca Falconeri* (H.F.).

The contributions to the cytology, embryology, ecology, morphology, physiology, economic botany and plant geography of Indian plants have also been satisfactory.

(Sd.) K. BISWAS,

Superintendent,
Royal Botanic Garden, Calcutta.

INDUSTRIAL SECTION, INDIAN MUSEUM.

(Annual Report for the year April, 1947—March, 1948)

A new chapter in the history of the Industrial Section of the Indian Museum may be said to have begun with the re-opening of the Exhibition Galleries to the public on the 5th May, 1947, after the World War II.

It may be stated that the period under review had been one of strenuous efforts on the design and proper organisation of the Museum and its attached sections, within limits of practicability.

The restoration work which was started in the previous year was continued. It was, however, soon realised that the method of display hitherto adopted did not indicate the artistic importance or educative value of the exhibits, and consequently the gallery would fail to stimulate any sustained interest. This necessarily led us to adopt a policy of improving the galleries to meet the first and most obvious needs.

The year under report thus opened with a huge problem—the problem of re-organisation and re-construction of the Museum—on the lines designed to increase the educational and entertainment value.

Restoration.—The department was fully engaged throughout the year with the restoration work and improvement of the galleries, in addition to the other normal duties such as attending to a number of inquiries, supply of materials, identification of specimens and dissemination of technical and commercial informations.

The exhibits in the galleries had to be re-arranged after the dislocation which took place during the War and the gallery was thrown open to the public on the 5th May, 1947.

The restoration of several thousands of specimens that still remained was continued and during the year we were able to make steady and substantial progress.

Improvements.—It was felt that in order to create sufficient interest and to relieve the monotony of the series of the exhibits, a colour scheme should be introduced into the gallery and the exhibits should be set up against suitable background which would give them good relief. Simultaneous with the restoration of the gallery, arrangements were, therefore, made for the lining up of the show-cases with suitable furnishing materials. This work was started by the middle of June, 1947 and during the year 171 show-cases were completed.

Classification, grouping and exhibition of certain selected exhibits which claim special preference over others has been another feature introduced into the gallery. Some of the important series are (1) Drugs acting on the various system in Man such as the Digestive, Circulatory, Respiratory, Nervous, Excretory, and Reproductive; (2) Tropical and sub-tropical fruits; (3) Vegetables classified under root vegetables, leaf vegetables, and fruit vegetables, and (4) Selected Fodder.

This is a decided improvement in that our visitors are now afforded facilities to study, understand and appreciate the numerous vegetable resources in relation to their economic aspects. It is proposed to draw up a number of such series of group exhibits so that the Museum would in future be more widely appreciated and better comprehended.

The main objective of this Museum being to display for the benefit of the public, India's vegetable products in relation to the economic life of the people, to interest the public, it would be necessary to so arrange the exhibits

that they tell a story from the raw products to the finished products in an interesting and instructive way. Attempts were made in this direction with great success by adopting the "Story Method" of display, a new technique employed in some leading institutions abroad.

Among the new exhibits arranged on these lines, mention may be made of the "Story of Paddy from grower to consumer", "Story of Tobacco from field to factory", "Story of Rubber", "Story of Indigo", each story being carried through specimens, beautiful photographs, colour paintings and models.

These exhibits are gaining increasing popularity and are highly appreciated by our visitors.

Reorganisation scheme.—The basic principle underlying any modern scheme of Museum organisation is that it should render maximum service to the country, to enrich progressively the intellectual, cultural and emotional life of the people.

Taking into account of the tremendous progress the foreign museums have made in the service of the country, and envisaging the considerable further improvement that has to be made in this Museum, the programme of exploration into problems of "Museum as an aid to the education of the child and the adult" was immediately taken up. A proper understanding and appreciation of Botany in Forestry, Agriculture, Horticulture, Pharmacology, Medicine, etc.—sciences which are intimately associated with a country's progress and welfare can be had only from a well organised museum, specially devoted to them. How this can be done in the fairest and most expeditious manner had been our main problem.

Museum Accessions.—The general acquisition comprising mainly of Timber, Food and Fodder, Fibres, Cotton, Narcotics, Beverages, Crude Drugs, Forest minor products and other miscellaneous articles shows a very great improvement this year.

Timber.—100 sized specimens of economic timbers from the Cochin Forests, South India, and one large specimen of a section of a Teak wood showing annual rings, procured through the District Forest Officer, Coimbatore, South India have enriched our collections of timber exhibits.

Food and Fodder.—A representative collection of Millets from Madras, consisting of the agricultural varieties of Sorghum H1, N1, Co. 2, Co. 3, Co. 1, Co. 4, Co. 5, Co. 6, Co. 9, obtained from the Millet Specialist, Coimbatore, 13 samples of pulses obtained from the Pulse Specialist, Coimbatore and 40 samples of different strains of paddy grown in South India, obtained from the Paddy Specialist, Coimbatore, have been exhibited in the gallery. To this were also added 20 samples of Rice, Wheat, Maize, Gram, and other indigenous food, which were obtained from the Directorate of Inspection, Ministry of Food, Government of India, New Delhi.

Tobacco Samples.—A most interesting and valuable collection of Tobacco exhibits consisting of wrappers, fillers, binders, Hookas, Cigar and Flue cured varieties has been made during the year. Special mention may be made of the Veda Sandur and Valai Kappal from Dindigul, local varieties from Ariyalur, Natu varieties from Anakapalle, beautiful leaf specimens of Harrison Special, Nowkhal, Sumatra, Manila and Motihar from Government Tobacco Farm, Rangpur; 6 varieties from South Arcot, and A. B. O. & D. grades of Indian Flue cured Virginia leaf from Guntur, and 6 small collections from Chidambaram.

The specimens are suitably exhibited with photographs illustrating the cultivation, curing and storing and they form a most interesting and instructive series telling the 'Story of Tobacco'.

Cotton.—A very large collection of different varieties of Cotton grown in various provinces was made during the year. Of these special mention may be made of Coconadas from Gurzala, Mungari, Cambodia, Karunganni, Tinnevelles, Red Northern and Westerns from Coimbatore, Vijaya from Broch 1027 A. L. F. and Suoyag from Gujarat, Co. 3, D5, D8 from Dacca, Joyawant from Hubli, Godag No. 1 from Godag, and one improved strain of *Gossypium arboreum* from Mutra.

The lint, kapas and the seeds of a great majority of these strains of Cotton are exhibited.

Bark cloth of Upas Trees.—Four highly interesting and beautiful specimens of large sized cured barks of Upas Tree (*Antiaris toxicaria* Leschen.) were procured from the Conservator of Forests, Travancore, South India. Of these, two specimens are coarse textured, while the remaining ones are fine textured. The largest "bark cloth" procured measures about 8' 8" X 6' 1". The cured and felted barks are said to be used by the hill tribes in making their garments and in making sacks for storing grains. The specimens are exhibited in a large wall case.

Travancore Coir Mattresses.—12 beautiful specimens of Coir mats and 12 mattresses with attractive and pleasing designs were acquired from the Alleppey Company, Ltd., Alleppey, South India. They are artistically displayed.

Fibres.—5 samples of different grades of Sunn Hemp (*Crotalaria juncea* Linn.) presented by the Inspector, Sunn Hemp Grading, Calcutta, were added to our rich collection of fibres. 4 samples of ropes of Manila Hemp, East African Sisal Hemp, Indian Hemp and Jute were acquired from the Ganges Rope Co., Ltd., Calcutta.

Rubber Exhibits.—Messrs. Bengal Water-Proof Works (1940) Ltd., Calcutta, kindly presented us with 14 exhibits consisting of hot water bottles, ice bags, hospital sheetings, rubber sheetings, surgical gloves, air rings, gum boots, boot holds, over-shoes, and seven photographs illustrating factory operations. These exhibits are displayed in a separate case.

A good collection of rubber seed (*Hevea brasiliensis* Muell.) was obtained from Venturia Estate in Travancore through Messrs. Harrison Crossfield Ltd., Quilon. The seeds are also exhibited.

Match Exhibits.—The Director, Western Indian Match Co., Ltd, Bombay presented specimens of different kinds of wood used in the manufacture of matches in Ambernath Factory, Dhubri Factory, Barielly Factory and Madras Factory. In addition, splints, veneers and boxes made from *Bombax malabaricum* DC., *Ailanthus malabarica* D.C., *Mangifera indica* Linn, *Sterculia campanulata* Wall. and *Wrightia tinctoria* Br. were also procured and exhibited.

Crude Drugs.—27 crude drugs were acquired from Nepal. These specimens with several other samples collected locally were added to the vast collection of crude drugs in the Gallery.

Coffee.—24 samples of coffee of different grades were acquired from the Mysore Coffee Curing Works, Ltd., Chickmagalur, Mysore State.

Lac Exhibits.—17 samples of crude lac and finished products were obtained from the Director, Indian Lac Research Institute, Namkum, Ranchi. These exhibits together with one map showing the lac producing areas in India and some photographs of special interest have been put on show.

Photographs.—104 photographs were collected for exhibition purposes and for our files. The interesting series are on Tobacco—(its cultivation, curing, grading, storing, etc.); Cotton—(its cultivation, ginning, cording, weaving, etc.);

Paddy—(its cultivation, milling, stacking, etc); Rubber Industry—(vulcanising, calendering, mixing etc.); Sugar cane—(its cultivation); Ganja, (cultivation, picking, pressing, cutting, etc.); Bamboo—(cutting and basket-making, etc), and various other pictures of topical interest.

Colour transparencies.—12 colour transparencies on Tobacco culture were prepared during the year. Arrangements are made to exhibit them in a suitable illuminated show-case. •

Water colour pictures—41 water colour pictures were prepared by the departmental artist on important medicinal plants, vegetables, human anatomy, tapping rubber in a rubber plantation. Besides, 6 large sized water colour paintings, showing elephants at work, stacking lumber in a depot were also prepared. These beautiful paintings have considerably improved the gallery and have contributed to a large measure to the grace of the Gallery.

Sketches.—Sketches of different types of cane crushing mills were also prepared and exhibited in the gallery. They are informative.

Flow chart.—2 flow charts, one on "Maize in the World Economy" (to illustrate its various uses in the manufacture of Starch, Dextrin, Syrup, Zein, Soap, in Textiles, Pharmaceuticals and tanning industries, in confectionery and brewery, etc.), and another on "the vegetable constituents of soaps and soap powders", were prepared during the year and exhibited. They are highly educative.

Diaromas and Models.—A beautiful diorama on "Paddy cultivation" consisting of twenty units of 6" models showing ploughing the field, sowing, transplanting, harvesting, threshing, milling, par-boiling, stacking and transporting, was prepared during the year at a cost of Rs. 365/-. In addition, 127 beautiful and realistic models of fruits (Mango, 5 varieties; apple, pear, litchi, oranges, plantain, pomegranate, melons, guava, wood apple, beal) and vegetables (Potato, carrot, tomato, brinjal, banana, beans, chillies, papaya, onions and gourds) were purchased at a cost of Rs. 39/-. These exhibits are highly interesting.

Miscellaneous.—One fan and two combs made of Sandal wood were purchased from the stall of the Chamarajendra Technical Institute, Mysore, in the All India Exhibition held at Calcutta during the end of the year under report.

Special Exhibition.—At the request of the General Secretary, All India Exhibition, the Museum associated itself with the activities of the All India Exhibition held at Eden Gardens, Calcutta during the period from the 15th February to the 14th April, 1948. The main purpose was to educate the public and to acquaint them with some of the important vegetable resources in the service of mankind. The important exhibits on show were, (1) Selected Food Products, (2) Selected Timber exhibits of high economic value, and (3) important medicinal plants and plant products, and (4) Selected commercial fibres.

Two beautiful specimens of felted barks (one coarse of size 8' 8" X 6' 1" and another fine) of Upas Tree, (*Anliaris toxicaris* Leschan.) procured from the Travancore forests were special features of the exhibition.

Another exhibition was arranged at the special request of the Principal of the City College, Calcutta, in their College premises during February 1948. It is gratifying to note that an increasing sense of "Museum Consciousness" is being realised to-day by the general public and many faculties.

Library.—The library attached to the Industrial Section of the Indian Museum, Botanical Survey of India was in a disorderly and unsatisfactory condition when I took over charge. This is attributable to the inadequate and unsatisfactory registers maintained hitherto in the library and to a greater measure to the dismantling and shifting of the library during the period of war, resulting in an enormous mixing up of several loose numbers and periodicals, memoris, monographs, records, reports, etc., which were kept in an unbound state for several years. The continuity of the publications were consequently disturbed enormously.

The lack of any recognised system of cataloguing and indexing the publication in the library coupled with the most regretted disorderly condition that prevailed, eventually led to our taking immediate measures to reorganise the library.

It is happy to record that inspite of the various inconveniences and difficulties experienced, good progress was made in the library since its reorganisation, in collecting, piecing up and sorting out loose numbers of various publications, and arranging the entire collection in an intelligible sequence. Cataloguing and indexing the library collections could not be undertaken earlier in the year, as there was considerable delay in obtaining index-cards and guide-cards from the Central Stationery Office, Calcutta. It is hoped that we would be able to show considerable progress in this also in the months to come.

In the reorganisation of the library, it is decided to adopt Dewey's Decimal System of Classification. It is proposed to compile card catalogues for authors and subjects, the author catalogue comprising the entries of authors, translators, editors, etc., while the subject catalogue, that of specific and general subject headings together with analytical and reference entries, all arranged alphabetically.

Along with author cards, shelf list cards will also be prepared and arranged in class orders, serving the purpose of an inventory as well as a partial subject catalogue.

The publication of a printed catalogue of various collections of the library is also under contemplation in the reorganisation scheme.

During the year under review, 826 publications have been added to the library of which about 300 were received entirely by gift and exchange.

Even under the strain of the reorganisation work, the staff co-operated in affording all facilities to a number of scientific workers for consulting the library freely and frequently.

Press.—The Departmental Press, mainly intended for the printing of labels for the exhibits in the Gallery needed a thorough overhauling. For administrative purposes, it was necessary also to take a stock of the different types and other sundries used in printing which was unfortunately overlooked in all the previous years. In view of the importance and urgency of this work, the normal printing work in the press was suspended for a short time. Along with the overhauling of the press, the different types and metal blocks were sorted out and weighed and an inventory of them was made for the first time. A scheme is also in view to run this press on better and more useful lines.

With the semi-restoration of the public galleries a few tri-lingual labels were introduced as an experimental measure. This was not without success, as there was an increasing demand made by the general public for the Hindi and Bengali labels to be introduced to the entire collection in the galleries.

The work in the press has been satisfactory. During the year 680 individual labels, 168 bi-lingual descriptive labels, 1257 labels for the library and 1750 forms for the office were printed in the press.

Herbarium.—The herbarium attached to the Industrial Section, Indian Museum received the usual care and attention. About 2,000 herbarium specimens were treated, 400 sheets were repaired, 200 sheets were incorporated and 180 specimens were freshly mounted.

About 100 specimens of economic plants collected from the suburbs of Calcutta and procured from other distant parts were also added to the collection.

9 herbarium sheets of Cotton varieties grown in South India obtained from the Cotton Specialist, Coimbatore, and about a dozen herbarium sheets of Jasmynes collected from Madras and Ootacamund in South India, were added to our Economic herbarium.

The herbarium was freely consulted to by many scientific workers. 87 sheets were temporarily loaned out for consultation.

The preparation of an index and publication of a catalogue of the most valuable collections in the herbarium is also under consideration.

Ledgering.—The revival of the ledgering work which was suspended for a long time is under consideration. Before we actually take up this work, the repairing of the damaged ledger boxes intended to keep these valuable records has to be done. The repairing work was taken up by about October 1947, and about 90 ledger boxes were mended so far departmentally. But in view of the larger number of boxes still to be repaired, it is now felt that to expedite the work it should be done on a contract basis. It is proposed to approach the Government to provide the necessary funds for this purpose.

Photography.—The importance of photographic records for study, publication and exhibition purposes and that of lantern-slides for educational purposes is too well known to be emphasised. During the year under review, 88 negatives and 46 lantern-slides were prepared by the writer on Cotton Industry, Paddy Cultivation, Ganja Cultivation, and various other subjects. In addition, 12 beautifully coloured lantern-slides on Tobacco culture have also been prepared. These will form the nucleus of a photographic and lantern-slide library which is contemplated to be set up in the department soon. It is also our intention to introduce "Museum series of Picture Post Card."

At the request of Dr. Manjunath, Chief Editor, Dictionary of Economic Raw Products of India, one photograph of *Borassus flabellifer* Linn. was taken by the writer and supplied to him to be included among the illustrations in the dictionary under publication.

It is most regretted that this department has no photographer in the staff and no well-equipped dark-room for photographic purposes. It is hoped that if our requirements are met, we could do considerable service in the direction of preparing a number of scientific photographic records.

Public Lectures.—The writer delivered a popular lecture on the 29th February, 1948, on "Grasses—Nature's most valuable gift to Mankind," being one of the lectures in a course of popular lecture arranged by the Trustees of the Indian Museum during the winter season. The lecture was illustrated with a number of beautifully coloured lantern slides, specially prepared for the purpose. The lecture was well attended and highly appreciated.

Meetings.—As a Trustee of the Indian Museum, the writer attended all the meetings except one, convened during the year.

Identification of Specimens.—Samples of Crude drugs and other botanical specimens were received from a number of scientific workers, officers of Government department and commercial concerns for examination and opinion as to their identity and quality. The writer rendered his best help in examining and identifying those products and furnishing the necessary information on them.

Some of the beneficiaries were Messrs. Drugs of India (Farmer's) Ltd., Calcutta; Messrs. Kemp & Co, Ltd., Calcutta; Messrs. Eastman & Co., Ltd., Calcutta; Messrs. Hind Chemical Ltd., (Kanpur), Calcutta; The Commissioner of Commercial Taxes, West Bengal, Calcutta, and a number of private individuals.

Supply of Materials.—Authentic specimens were supplied to some research workers in India and abroad.

Dr. B. A. Krukoff of the New York Botanic Garden, U. S. A. was supplied with a good collection of plants of *Enhydra fluctuans* Lour. and root samples of *Lasia heterophylla* Schott. for his research work.

Prof. V. J. Chapman of the Auckland University, New Zealand, was supplied with 50 different kinds of Gums, Resins and Dyes, Tanning materials for exhibition and study purposes in the Auckland University College Museum. The Chemical Examiner to the Government of East Punjab, Kasauli, was sent a small sample of viable seeds of *Lolium temulentum* Linn. for his researches. The Principal, Lallubhai College of Pharmacy of Ahmadabad was sent to 2 herbarium sheets of *Datura Stramonium* Linn. Dr. B. Mukerji, Director, Central Drugs Laboratory, Calcutta was supplied with two varieties of seeds of *Datura fastuosa* Linn. and seeds of *Datura Stramonium* Linn, for his researches. He was also supplied with some fresh seeds of *Brassica juncea* Hk. f. t. and *Lathyrus sativus* Linn, for his chemical investigations.

Mr. S. N. Bal, Director, Pharmacognosy Laboratory was supplied with herbarium specimens of *Claviceps purpurea* Tulasne. collected from Nilgiris and a number of specimens of Jasmines procured from Madras. He was also supplied with 22 different kinds of gums and Resins for study purposes.

Information Supplied.—Scientific workers of different educational Institutions and Government offices were supplied with informations on various economic plants and their products.

The Sylviculturist, Forest Research Institute, Dehra Dun, was furnished with all available information on *Broussonetia papyrifera* Vent.

The Director, Central Drugs Laboratory, Calcutta, was furnished with names of parties who could supply his requirements of Chitral Gum (*Astragalus strobiliferus* Royle.).

The Director of Archives, Government of India, Imperial Records Department, New Delhi, was furnished with the vernacular names of the plant *Soyimida febrifuga* Guss.

The Agricultural Assistant, Department of Agriculture, N. W. F. P., was furnished with information regarding facilities for the study of medicinal herbs.

The Director Dairy Research, Indian Dairy Research Institute, Bangalore, was supplied with information on the source of berries of *Withania coagulans* Dunal.

Mr. D. Bhattacharjee of Jaggannath Intermediate College, Botany Department, Dacca, was furnished with detailed information on *Terminalia chebula* Retz, its different commercial uses, export statistics, distribution and markets in India.

Mr. R. N. Dutta of the same institution was given statistical information regarding export and import of Betel-nuts (*Arca Catechu* Linn.)

Prof. T. R. Seshadri, Head of the Department of Chemistry, Andhra University, Waltair, was informed about the sources of supply of the resin and rhizome of *Podophyllum emodi* Wall.

Mr. D. Vaidyanathan of the Department of Biology, Bhavan's College Andheri (Bombay) was furnished with an up-to-date list of the publication in the records of the Botanical Survey of India for his information.

The librarian of the East Punjab University Library Club, Simla, was sent a list of text books and other important publications relating to botany for making a selection in connection with the purchase of books for the East Punjab University.

The Veterinary Disease Investigation Officer to His Highness Government of Jammu and Kashmir, Srinagar, was communicated the result of a chemical analysis of a Male fern sent by him for examination.

Information supplied to Commercial Firms.

Name of Firms.	Subject.
1. Messrs. S. Zahur Ahmad, Abdur Rauf, Hide Markot, Multan City.	Regarding a grass known as Raffia grass.
2. Messrs. Drugs of India (Farmer's) Ltd., 98/4, Olive St., Calcutta.	Furnished information on <i>Guaiacum sanctum</i> Linn. and the Botanical name of Agary, and vernacular names of Anise and Fennel.
3. Messrs. Himmat Rai and Sons, Punjab.	Detailed notes on the methods of collection and preservation and storage of plant specimens for a herbarium.
4. Messrs. Eastman & Company, Calcutta.	Names and addresses of some Crude Drug dealers. Also translated certain French names of medicinal plants and gave the equivalent Eng. and scientific names of those plants.
5. The Manager, Azad Hind Chemical Ltd., Punjab.	A list of important books on medicinal plants.
6. The Chief Analyst, Boots Pure Drugs Co., Bombay.	Sources of supply of authentic samples of <i>Hyoscyamus</i> .
7. Messrs. Nasir Ahmad, Calcutta.	The Hindustani name of Caoutchouc and the name of the plant producing it.
8. Messrs. Drugs of India, Calcutta.	Furnished information on the local names, habitat and sources of supply of <i>Scoparia dulcis</i> and Ergot of Rye, Lata Kasturi <i>Psoralea corylifolia</i> and also seeds of <i>Hibiscus abelmoschus</i> in large quantities.
9. Messrs. Himmat Rai & Sons, Delhi.	The sources of supply of <i>Podophyllum emodi</i> Wall. <i>Hyoscyamus niger</i> Linn. and <i>Drosera rotundifolia</i> .
10. The Manager, Hemahata & Co., Ootacamund, South India.	Detailed information on properties and uses of <i>Lobelia inflata</i> Linn and <i>L. nicotianae-folia</i> Heyne used as an Indian substitute of <i>Lobelia inflata</i> Linn.

11. Maharaj Mool Singh, Jayvilas Identity of Somlata. Palace, Mount Abu, Rajputana.
12. Messrs. Herbal Herald & Co, Detailed information on Copal, Red Gum, and Calcutta. Lac.

Research and Publications.—Two original contributions made by the writer were published during the year under review, viz.

- (1) Ecology and seasonal succession of the Marine Algae at Mahabalipuram (seven Pagodas) near Madras in Prof. M. O. P. Iyengar Commemoration Volume, Journ. Ind. Bot. Soc., 1946.
- (2) Observations on some Balanidae from Mahabalipuram in Journ. Bomb. Nat. Hist. Soc., Vol. 47, No. 1, 1947.

In the former the writer has dealt with (a) the various zones that could be recognised according to the dominant forms of Algae occurring in each, together with their associated forms; (b) the seasonal changes and the algal period that could be recognised according to the composition and luxuriance of the algal forms; (c) the seasonal occurrence of some of the chief forms; (d) the algae occurring in pools; and (e) the algae growing on large Barnacles.

In the latter, the ecology of some of the dominant Barnacles were dealt with, with a note on several algae growing on the shell, as shell boring algae, encrusting or cushion forms, or large macrophytes growing attached to the shells by a basal system.

A catalogue of 'Gums and Resins' in the Industrial Section, Indian Museum, is in the manuscript stage, and will be published soon.

In collaboration with Dr. Mukerji, Director, Central Drugs Research Laboratory, Government of India, the writer is working on Indian *Gordonias*. Certain interesting results are obtained and further investigation is in progress.

Pharmacognosy Laboratory.—The Pharmacognosy Laboratory, instituted under the Ministry of Health, Government of India, was accommodated in the Industrial Section, Indian Museum Building till the 1st February, 1948. The Laboratory was rendered the necessary facilities for its proper functioning.

Partition.—Under instruction from the Government of India, during second quarter of the year, we had to labour hard in preparing several statements in connection with the partition of the assets and liabilities of the Government of India at Centre. The Government of India decided that this office is not to be divided. No partition was, therefore, effected.

Visitors.—The attendance has been increasing steadily since the Museum was thrown open to the public early in the year.

The galleries were honoured on the 9th March 1948 by a visit by H. H. Lord Louis Mountbatten, Governor-General of India, accompanied by Lady Brabourne Mountbatten and Lady Pamela Mountbatten. The writer received Their Excellencies and explained to them the general purpose of the galleries and certain exhibits of special interest. Their Excellencies highly appreciated many of our interesting exhibits.

A few organised parties also visited the Museum. Special mention may be made of the party that visited on the 2nd January, 1948 from the Indian Forest College, Dehra Dun, U. P. consisting of 25 students, led by Messrs. P. N. Suri, A. M. E. Brito Mutunayagam, S. Ramaswami. While conducting the party round the galleries, the writer gave a demonstration lecture which was appreciated.

Finance.—The original budget grant for the year under report, exclusive of the grant under the Scheme for the training of the research students in Systematic Botany and Taxonomy, the control of which was vested in the Superintendent, Royal Botanic Gardens, Sibpur, Calcutta, but inclusive of the amount sanctioned for the additional staff in connection with the scheme for the reorganisation of the Botanical Survey of India, was Rs. 3,87,000/- (Rupees three lakhs and seven thousand). The revised budget grant for the period from 15th August, 1947 to 31st March, 1948 after the partition of India into Indian Union and Pakistan, was Rs. 1,10,900/- out of which a sum of Rs. 67,700/- was surrendered to Govt. as the reorganisation scheme was not given effect to during the year. The rest of the amount was almost spent.

Staff—I was appointed to officiate as Curator, Industrial Section, Indian Museum, with effect from the 1st April, 1947. The post of the Director, Botanical Survey of India, being not filled up, his duties were also discharged by me, in so far as this office is concerned.

Dr. S. K. Mukherjee, Curator of the Royal Botanic Garden, Sibpur, Calcutta was appointed by the Government of India as Systematic Botanist under the Botanical Survey of India for a period of ten (10) months with effect from 7th February, 1948 for the exploration of the Flora of Naza and Mainpur Hill Tracts. Mr. S. K. Chakravarty, an outsider, was temporarily appointed in the Library as an assistant on 20th January, 1948. He resigned his post on the 5th February, 1948. One temporary bearer was appointed in the Library for a period of one year with effect from the 10th September, 1947. The Government have been pleased to extend up to the 29th February, 1949, the temporary post of the Gallery Assistant created during the year 1946, Mr. A. Banerjee was Head Clerk throughout the year except from 8th September, 1947 to 22nd September, 1947, from 31st October, 1947 to 30th November, 1947, from 3rd January, 1948 to 15th February, 1948, and from 27th March, 1948 to 11th April, 1948, when he was on leave, and Mr. J. M. Sen, officiated as Head Clerk from 3rd November, 1947 to 30th November, 1947 and from 3rd January, 1948 to 15th February, 1948.

Mr. J. M. Sen continued as Gallery Assistant except for the period 12th March, 1948 to 27th March, 1948, when he was on leave and for the period when he officiated as Head Clerk. Mr. A. Basu, officiated as Gallery Assistant during the period of absence and promotion as Head Clerk of Mr. J. M. Sen.

No employee of this office opted for Pakistan.

All the members of the staff worked satisfactorily.

K. S. SRINIVASAN,

Curator,

Industrial Section, Indian Museum.