

X. REPORT BY DR R.E.HOLTUM ON HIS
ROUND-THE-WORLD STUDY TRIP 1959-60

1. Introductory.---This project was to study fern specimens in certain herbaria in the U.S.A., especially of tree-ferns (Cyatheaceae), in connection with preparation of the Pteridophyte Series of Flora Malesiana, and to make contacts in the U.S.A. with a view to continued cooperation in this work.

The family Cyatheaceae, on which I am at present engaged, is a particularly difficult one, comprising 350 described species in Malaysia, in a close alliance. Probably all should be regarded as belonging to one genus. Descriptions of species have on the whole been unsatisfactory, so that many identifications of specimens in herbaria are doubtful or erroneous. It is thus necessary to see all type specimens to establish the significance of names; and also, as the fronds are large so that only a part of one appears on each herbarium sheet, the different specimens of the same collection, distributed to different herbaria, often give complementary information, so that to see one is not enough. Furthermore, it is necessary to see as many collections as possible, to understand what variation is possible within a species. The material is bulky, and it is a physical impossibility to gather together in one place all that one needs to see for a proper understanding of the family. I had already spent more than a year on this study before going to the U.S.A., and had seen most of the type material in European herbaria.

I spent the period 22 November 1959 to 20 February 1960 in the U.S.A. As I wished, for personal reasons, to go on to Australia, I went from Washington to San Francisco, and thus

had the opportunity of seeing specimens in the herbarium of the University of California at Berkeley. In Australia, I made my principal stay at Melbourne, where I visited the herbarium, making short visits also to Sydney and Brisbane on my way homewards. I returned to London May 10, 1960, by way of Bogor (Indonesia), Singapore, and Kuala Lumpur, with a short visit also to Ipoh.

2. Gray Herbarium of Harvard University.---With this is combined the herbarium of the Arnold Arboretum, containing a set of the important collections of ferns made in New Guinea by L.J.Brass during the various Archbold Expeditions. This includes a very fine set of specimens of tree-ferns. I examined all Malaysian Cyatheaceae in the herbarium, and selected some specimens for further study at Ann Arbor. The loan of this material was kindly arranged by Dr Rolla Tryon, to whom I am much indebted for help during my visit to Harvard. I also identified provisionally some recent collections of other Malaysian ferns. At this herbarium also I met Dr K.L.Wilson, whose recent detailed studies of fern sporangia promise to give important new evidence on the inter-relationships of ferns.

3. South Hadley and Amherst, Mass.---Here Dr A.G.Stokey and Mrs G.Atkinson are preparing a book on the gametophytes of ferns, summarizing the work of many years. I have corresponded with them and have sent them spores from Malaysia and Kew at various times in the past, and was glad of the opportunity of discussing with them common problems and possible further cooperation.

4. University of Michigan.---Here my principal object was to study the herbarium of fern specimens, collected together from many sources by Dr E.B.Copeland during over 50 years' study, now the property of the University. Dr Copeland described a large number of new species of ferns (including 58 of Cyathea alone from the Philippines), and type material of nearly all of them is in his herbarium. Here I studied the family Cyatheaceae in detail, and also the Malaysian tree-ferns of the Dicksonia alliance (a small group); I also made a preliminary survey of the genera of the Lomariopsis group, and listed the type specimens in the Thelypteris group. I saw type material of all but one of Copeland's species of Cyathea. I am very grateful to Dr Warren H.Wagner for providing every facility for my study, and for undertaking to consider future cooperation in the preparation of the Pteridophyte Series of Flora Malesiana.

5. U.S.National Herbarium, Washington.---This herbarium probably contains the largest collection of Philippine plant specimens extant, since the destruction during the late war of

the herbarium at Manila. I made a survey of all Malaysian specimens of Cyatheaceae, of many of which I had already seen duplicates in other herbaria, and obtained a good deal of new information. I also looked at the tropical American species of the family, which have been intensively studied at Washington by W.R. Maxon and C.V. Morton, with a view to a better understanding of the relationship between the American and Malaysian species; also with a view to a clearer idea of possible subgeneric groups in the family. It is my opinion that such groups have never yet been clearly distinguished. Mr C. V. Morton was very helpful during my stay at Washington, and has always responded to requests for loan of specimens throughout my studies for Flora Malesiana.

6. University of California, Berkeley.--The herbarium at Berkeley contains collections from the Philippines not represented in other herbaria in the U.S.A.; they were deposited by the late Dr E.D. Merrill when he was at the University. I examined all Malaysian Cyatheaceae.

7. Melbourne, Australia.--This herbarium contains some early collections from New Guinea. I spent a few days at the herbarium, examining all Malaysian Cyatheaceae and also specimens of the Dicksonia group of tree-ferns.

8. Sydney.--Here Miss Mary D. Tindale has for some years devoted much time to a study of Australian ferns; she published a detailed account of the Australian Cyatheaceae a few years ago. I examined Australian and New Guinea specimens of Cyatheaceae in the Sydney herbarium, and discussed these and other ferns with Miss Tindale.

9. Brisbane.--The Brisbane herbarium contains important recent New Guinea collections, and also specimens from the Solomon Islands. I examined all Cyatheaceae in the herbarium. Mr S.L. Everist and Dr S.T. Blake were very helpful during my visit.

10. Bogor.--I spent eight days at Bogor, and made a hasty re-survey of the large collection of specimens of Cyatheaceae in the herbarium, of which I made a preliminary study in the early part of 1958. I was able to revise tentative identifications made before I had seen type collections not represented at Bogor. Mr Anwari Dilmy and the herbarium staff gave every assistance in my work.

11. Singapore.--In the herbarium at the Botanic Gardens I made a similar re-survey of Cyatheaceae. With Mr H.M. Burkill, Director, I made an excursion into Johore, and obtained some living fern plants for cultivation at Kew.

12. Ipoh.--At Ipoh I visited Mrs F.G.H. Allen, who has made an intensive search for ferns in various parts of Malaya and Sarawak during recent years, and has added several species to the known flora of the Malay Peninsula. I examined her recent

collections of Cyatheaceae, discussed them with her, and made two short excursions to see living plants. I collected young plants of several species of ferns to bring alive to Kew.

13. Kuala Lumpur.--I stayed a few days with Prof.M.E.D.Poore, head of the new department of botany in the University of Malaya in Kuala Lumpur, and made two excursions into the forest, gathering further small living plants of ferns (Cyathea and other genera) for cultivation at Kew.

14. Kew.--Since my return to Kew, these plants have nearly all started to make new growth. The living fern collection at Kew is now extremely rich in species, and is in excellent condition. It is a most valuable adjunct to the herbarium in my studies, and I am grateful for continued cooperation in this matter, to the Director and all members of the staff, especially to Mr H.J.Bruty, Foreman in charge of the tropical fern houses.--R.E.Holttum.