

XII. REGIONAL FLORAS, A SIGNIFICANT MODERN TREND
IN PLANT TAXONOMY

Besides through monographic work plant taxonomy has a second way of framing synthetic attempts and that is by compiling Florulas and Floras, containing a complete account of the flora of parts of the globe, of cities, islets, islands, states, countries, or continents. Irrespective of their style, concise or elaborate, their elaboration is closely connected with the history of the exploration of the areas they deal with. And the latter is again closely connected with the history of the opening and discovering of the world by science, that is human history. The course of the history of the botanical exploration and the compilation of Floras, small and large, was besides to a high degree dependent on the activity of botanical explorers and botanical centres in Europe.

Among these Floras there are small or at least restricted ones which I will call "local Floras", dealing mostly with a more or less local politically or administratively defined country, and large ones which I will call "regional Floras".

In the accumulation of our knowledge of countries in Indo-Australia there have been, mutatis mutandis, seven phases of development. These phases are for the reasons alluded to above neither synchronous nor is the length of time of each phase the same in different regions. But they follow each other step-wise in a similar sequence in all five cases examined (1). I have named them as follows:

- 1) Initial phase. For most tropical countries before 1800, not rarely pre-Linnean, mostly concluded by one relatively large work by a single-handed botanist, often amateur.
- 2) First exploratory and descriptive phase. Several early botanists explore intentionally the area in question. Collections are worked out.
- 3) First compilatory phase. Some botanist(s) in a European centre - frequently the mother-country of the colony - feel(s) the need of concentrating the assembled knowledge in one large regional Flora. This Flora is still very incomplete; it is obsolete from the present point of view and leads automatically to the phase
- 4) Second intensified exploratory and descriptive phase. The centre of the work is in this phase often transferred to the tropical country itself or performed in close collaboration overseas. This leads ultimately to the need of
- 5) Basic regional Flora, which, even to present standard, remains a basic work, if well planned and performed and compiled not too prematurely, that is when the exploration had reached a reasonable density. The large, chaotic literature developed during phase 4 is critically worked out in a colossal unifying effort occupying several decades (20-50 years).
- 6) Decentralization phase. On the basis of the basic regional Flora of phase 5 it appears subsequently desirable to work out smaller local Floras of the same area as improved extractions of the regional Flora. The Flora of British India is for example the result of phase 5, the local Floras of Ceylon, Bombay Presidency, Flora Simlensis, Madras Presidency, Bengal, and Assam are the local offspring by decentralization of phase 6. In Australia and Africa similar sequence of phases 5 and 6 can be observed. In certain regions phase 5 was very late, as for example in Malaysia where phase 5 started with the Flora Malesiana. In China phase 5 is still in the cradle. Regions where phase 6 has already developed several decades ago, feel again the need of the next phase

7) Final critical, regional Flora. Through the long lapse of time since it started there appears desirability for a second elaboration of the regional Flora of phase 5. Nomenclature has changed, there has gradually grown the necessity of verifying the identity of new taxa and new records described in that period. There is also great need for correlation with neighbouring regional Floras and contemporary monographical and revisional work with its changes in specific and generic delimitation.

At the end of the 19th century there were 7 regional Floras, viz 1. Flora Brasiliensis, 2. Botany of the Biologia Centrali-Americana (not a proper Flora but an enumeration), 3. Flora Capensis, 4. Flora of Tropical Africa (unfinished), 5. Flora Orientalis, 6. Flora of British India, and 7. Flora Australiensis.

About three decades ago only three regional Floras were still elaborated, viz 8. Flora of North America, 4. Flora of Tropical Africa, and 9. Flora of the U.R.S.S.

The first has unfortunately not attained the pace which could have been expected, probably partly due to its rather heterogenous character, temperate to nearly tropical. It would probably have been better if it had not included too much tropical country, and left the latter for a general Flora of Central America. Rather numerous local Floras were compiled of various parts of North America.

If we are well informed there are definite plans for a modern new edition of 3. Flora Capensis.

The 4. Flora of Tropical Africa is still unfinished and its very early volumes are obsolete. In the meantime several local Floras were planned and decentralization phase 6 was entered rather untimely (Floras of West Tropical Africa, Congo Belge, East Tropical Africa, Flora of Angola, Flora of the Sudan, etc.).

But it has already appeared more efficient to join the Floras of Angola, Rhodesia, and Mozambique into a much larger "Flora Zambesiana".

And there are several botanists who deplore the political delimitation of the Tropical African Floras and who are in favour of a large regional "Flora of Tropical Africa" instead.

In tropical America the fifth phase was roughly indicated by 1. Flora Brasiliensis and 2. Botany of the Biologia Centrali-Americana. There followed the decentralization phase 6 with the separate local Floras of Jamaica, Peru, Guatamala, Panama, Trinidad, Surinam, etc., and the start of a second Flora Brasilica. Here also the large regional Flora lives in

the minds of the leading botanists and recently an elaborate scheme has been offered for consideration to Unesco to attain a large regional 10. Flora Neotropica.

The need of a regional Flora of South-east continental Asia is eminent. There is no attempt to come to it. Indian botanists obviously desire only a new Flora of India, but do not contemplate, as far as I know, to go beyond. It should be admitted, however, that the Flora of India cannot be separated from the Floras of Burma, Ceylon, and Pakistan (formerly included in the Flora of British India), Thailand, and Indo-China. This is one large plant-geographical unit tolerably well defined, bordered in the West rather abruptly against the arid Floras of Asia Minor (botanically from Turkey to Afghanistan), on the North by the Tibetan flora beyond the Himalayan ranges, on the South by the Indian Ocean and the isthmus of Kra, on the East by the China Sea, and in the North-east more or less artificially defined against the Chinese flora in the Yunnan transition. This "Flora Asiae Tropicalis" would naturally be a huge project, even though a firm basis of a major part of it is incorporated in the Flora of British India. Similarly to all the other regional Floras it must be a supra-national effort requiring a great deal of negotiations with various governments before a good organization and financial basis can be attained. From the standpoint of scientific botany this is naturally the only sound solution for an efficient correlation of the taxonomy and nomenclature of this surface of the globe which covers territory of more than ten countries, which will all share the benefit of such a joint work. Of course there are two other very important items viz the attracting of a permanent staff of trained and devoted collaborators and a working centre with large reference collections and an adequate library. Such collections and libraries are extremely scarce in South-east Asia and hence a close collaboration, including also exchange of personnel with the large European herbaria, will be *conditio sine qua non*.

Attempts towards a regional 11. Flora of China date from very recent time. In a catalogue of 1958 I saw announced that the Chinese plan the publication of a flora of 70 volumes to be published in 7 years, which seems fantastic in view of the fact that the bulk of the early Chinese collections is represented in European and American herbaria.

In 1948 the 12. Flora Malesiana project was launched, filling the vacuum between continental Asia and Australia.

Recent news from Australia reached us of a plan towards a new regional Flora of Australia, which continent since the completion of Bentham's magnificent work has occurred in decentralization phase 6.

The need for a final critical regional Flora is also felt in Europe and a British centre has established itself to work out 13. Flora Europaea.

From these data it follows that the necessity of compiling large regional Floras is very much alive in the minds of the contemporary taxonomists (2). Naturally these works are all colossal undertakings, specially as in the case of Flora of China and Flora Malesiana, both of which cannot base themselves on a former trustworthy precursor, incomplete as it might have been; they are faced with an enormous chaotic literature.

If there are basic regional Floras they must carefully be compared with later studies and revisions, later records must be inserted, generic concepts must be considered, specific distinctions must be checked with later material, and nomenclature must be carefully revised and brought in accordance with the present Rules of Nomenclature.

Therefore also new editions of basic regional Floras are colossal undertakings for which no single person can be responsible. They must necessarily be almost always international co-operative attempts. They need a persistent, wholehearted devotion of the botanists and institutes who agreed to join the effort.

The composition of such regional Floras requires a good deal of planning for redaction (2). Besides the organization and its permanent office, there must be agreement about the scope of such work. Although modern Floras are expected to contain more than the mere keys, diagnoses, and names of the plants, it is advisable to treat other matter (uses, vernaculars, ecology, etc.) in a concise way, as otherwise the Flora will be overloaded and attain too large dimensions. Specially adequate ecological information is difficult to derive from data of herbarium labels by taxonomists who have never visited the region to the Flora of which they contribute. In the editorial committee there must be members who can take care of this section and field workers to co-operate.

A major issue in the composition is the delimitation of the region, because the efficiency of a regional Flora over a set of local Floras covering together the same region will only come to full advantage if the region is delimited in such a way as to coincide roughly with a major plant-geographical province. And although in general botanists will easily be convinced of this advantage from the scientific point of view, there will generally be an emotional feeling

of chauvinism to be overcome to compile a work which does not coincide with political frontiers and is of a supra-national character. For example, a new *Flora Orientalis* would possibly include certain western parts of India and West Pakistan, and a new regional *Flora of South-east Tropical Asia* should include, besides India, the territories of Pakistan, Burma, Thailand, and the rest of the Indo-Chinese Peninsula, where the boundary against China will, in all probability, remain rather arbitrary. A good understanding of the floristic plant-geography is therefore necessary for the delimitation of regional Floras. Naturally for practical reasons arbitrary boundaries must be accepted. It would for example not be advisable to make a flora of an entire South American continent because of the size and heterogeneity of such a work. It must be possible to find reasonable or at least practically acceptable boundaries to divide the South American continent in two or three provinces on a phytogeographical basis.

But it follows that for the compilation of such large regional Floras the natural chauvinism of the administration of different governments should be overcome. These administrations should be convinced of the value of attaining wholehearted, officially sanctioned intensive co-operation between institutes and botanists in adjoining but politically separate countries. I believe it necessary to have, for such supernational undertakings, the full support of the Governments concerned. Negotiations to attain this must henceforth be made on the highest possible level. And international organizations, as Unesco, I.U.B.S., I.A.P.T., etc. may play an extremely valuable role in such negotiations and exercise persuading power. If such agreements have been obtained it will generally not be difficult to locate funds for the execution of the work.

The great value of regional Floras is closely connected with the increasing difficulties entailed in the composition of world monographs of the larger families and genera. The magnitude of such tasks has grown immensely and it appears that fewer and fewer qualified botanists are for various reasons able or prepared to undertake such tasks.

The composition of regional Floras brings along that families are at least revised over large areas, and such regional monographs are major efforts to revise at least large parts of such families.

Concluding, it appears that the planning and composition of regional Floras is not without good reason getting inten-

sive attention and that they will play a major role in the future progress of plant taxonomy.

References:

- (1) Vakblad voor Biologen 29 (1949) 27-29; Proc.8th Pac.Sc. Congr.Manila 1953 vol.4 (1957) 493-500, fig.
- (2) General principles in the design of Floras. Int.Bot. Congr.Paris (1954). Rapp.& Comm.sect. 2-6, p.59-66.