

may be more correctly appreciated by what is known to be present rather than what is problematically absent. The composition of the Panama flora, so far as investigated by Seemann and Hayes, is so decidedly South American that there is no necessity for insisting upon it, and northward extensions are prominent. Taking some of the mainly tropical orders, such as the Dilleniaceæ and Anonaceæ, we note a gradual thinning out northward, and an extension into the southern province of many South-American species. The essentially eastern South-American Lecythideæ, a suborder of the Myrtaceæ, is represented by four genera and seven species, one of which is common in Nicaragua, the northern limit of these trees. *Podocarpus* replaces *Pinus* in the mountains of Costa Rica, and the Cyclanthaceæ are relatively numerous in the lower regions. Noteworthy examples of southern limits of northern types are offered by *Liquidambar**, *Sabiaceæ*, and *Juglandæ* in Costa Rica, and *Pinus* in Northern Nicaragua. The oak vegetation of the Volcan de Chiriqui comprises at least three species; and *Arbutus* and *Arctostaphylos* give way to South-American genera of the Vacciniaceæ in the mountains generally. *Chamædorea*, the characteristic genus of palms in the oak-forests of South Mexico, is represented in the southern province by at least half a dozen species, but the majority of the palms belong to genera having their greatest development south of Panama. Many other examples of a change in the vegetation nearly coincident with the northern boundary of Nicaragua might be given, but it seems needless.

An examination of the specimen of the mountain flora (pp. 282-299) brings to light the fact that nearly, if not quite, all the genera there recorded from 8000 feet and upwards in our southern province are such as range from Mexico to the Andes of South America, and some of them wider. As bearing on this question it may be mentioned that the alpine forms of the Andes of South America belong for the greater part to the same genera which inhabit the higher regions of the Andes of Central America and Mexico, though the species are very rarely identical. Engler very fully discusses the relationships† of the vegetation of the upper regions of the mountains of South America and Mexico and the northward and southward migrations that may have taken place. We feel convinced that there has been a northward extension of temperate and alpine forms as well as of tropical, and should regard such genera as *Drimys*, *Fuchsia*, *Colobanthus*, *Calceolaria*, *Roupala*, &c.‡ as of southern origin. There are other genera peculiar to these mountains so equally developed north and south of the Isthmus of Panama that they may have migrated in either direction, always assuming that each type originated in only one place.

Finally, it may be briefly stated that the foregoing attempt to analyze the flora of

* Inadvertently left out of our distribution tables.

† Versuch, &c. ii. pp. 215-256.

‡ For further particulars on this subject see Botany of the 'Challenger' Expedition, i., Introduction, pp. 52-65.