

being immediately at the time of which we speak; nor till the evil had grown to a more inconvenient magnitude.

Period of Accumulation of Materials. Exotic Collections.—The fishes of Europe were for some time the principal objects of study; but those of distant regions soon came into notice.⁴ In the seventeenth century the Dutch conquered Brazil, and George Margrave, employed by them, described the natural productions of the country, and especially the fishes. Bontius, in like manner, described some of those of Batavia. Thus these writers correspond to Rumphius and Rheede in the history of botany. Many others might be mentioned; but we must hasten to the formation of systems, which is our main object of attention.

Epoch of the Fixation of Characters. Ray and Willoughby.—In botany, as we have seen, though Ray was one of the first who invented a connected system, he was preceded at a considerable interval by Cæsalpinus, who had given a genuine solution of the same problem. It is not difficult to assign reasons why a sound classification should be discovered for plants at an earlier period than for fishes. The vastly greater number of the known species, and the facilities which belong to the study of vegetables, give the botanist a great advantage; and there are numerical relations of a most definite kind (for instance, the number of parts of the seed-vessel employed by Cæsalpinus as one of the bases of his system), which are tolerably obvious in plants, but which are not easily discovered in animals. And thus we find that in ichthyology, Ray, with his pupil and friend Willoughby, appears as the first founder of a tenable system.⁵

The first great division in this system is into *cartilaginous* and *bony* fishes; a primary division, which had been recognized by Aristotle, and is retained by Cuvier in his latest labors. The subdivisions are determined by the general form of the fish (as long or flat), by the teeth, the presence or absence of ventral fins, the number of dorsal fins, and the nature of the spines of the fins, as soft or prickly. Most of these characters have preserved their importance in later systems; especially the last, which, under the terms *malacopterygian* and *acanthopterygian*, holds a place in the best recent arrangements.

⁴ Cuv. p. 43.

⁵ Francisci Willoughbeii, Armigeri, *de Historia Piscium*, libri iv. jussu et sumptibus Societatis Regiæ Londinensis editi, &c. Totum opus recognovit, coaptavit, supplevit, librum etiam primum et secundum adjecit Joh. Raius. Oxford, 1668.