

and by some peculiar Cyprinodonts, such as *Belonesox* and *Xiphophorus*. This may be termed the Guatemalan Province. Costa Rica and Panama comprise a fourth province, in which many of the South-American types attain their northern limit (e. g., *Acara* and *Geophagus* of the Cichlidæ, *Curimatus*, *Gastropolecus* and some other Characinidæ, the Loricariidæ). In this, the Isthmian Province, the only nearctic form is *Lepidosteus tropicus*.

5. THE SHORE-FISHES OF THE ATLANTIC AND PACIFIC COASTS OF MEXICO AND CENTRAL AMERICA.

There is a great similarity between the fishes found on the Atlantic and Pacific coasts of Central America. It was formerly stated that a considerable proportion of the species were the same on both coasts, but in recent years the number of supposed identical species has been greatly reduced by more detailed comparison.

In the present work only those groups of shore-fishes which enter fresh water are considered; as a result of my studies on these I am inclined to think that if we eliminate pelagic or semi-pelagic fishes of wide distribution, very few species will be found to be identical on both coasts, and that these will probably be fishes which enter rivers for considerable distances. Such fishes may have become involved in those geological changes which have led to the occurrence of the same fresh-water species in rivers of the Atlantic and Pacific Slopes.

Many of the species which were formerly considered to be the same on both coasts are now found to be distinguished by slight but constant differences. In such cases, where an Atlantic species is more closely related to a Pacific one than to any on its own side, it is reasonable to suppose that both are derived from a parent species which inhabited the neighbouring parts of the two oceans at the time when there was a connection between them. Such a marine connection appears to have existed in the Eocene over what is now the Isthmus of Panama, and there are good reasons for believing that it ceased at the beginning of the Miocene.

A comparison of the shore-fishes of the two coasts should therefore give data as to the nature of the specific characters which may arise during isolation and as to the time required for specific differentiation in certain groups.

The following species are included in the systematic part of the present work and may be paired together, the members of each pair satisfying the definition that they are more closely related than either is to any other species, and that they represent each other on the Atlantic and Pacific coasts :—