

affinities in all possible directions, with the highly petaloid ambulacra of the Spatangoids, with the simplest ambulacral petals of the earliest Spatangoids, or with the embryonic ambulacra of the *Pourtalesia* proper.

COMPARISON BETWEEN THE TERTIARY AND RECENT ECHINIDS.

In comparing the Tertiary fossil Echinids of the European beds with the species now living in the West Indies, we cannot fail to be struck with the similarity existing between them. It is well nigh impossible to distinguish the species, and even Cotteau hesitates to consider them as specifically distinct. Compare thus the species of *Cidaris*, *Clypeaster*, *Echinolampas*, *Schizaster*, and *Brissopsis*, which are found in the Tertiary beds of Malta, and are no longer found in the Mediterranean, having undoubtedly disappeared from there as soon as the Mediterranean became a closed sea, and the temperature of the water became raised above that of the ocean;¹ while, on the contrary, where the oceanic conditions have not undergone any such great change, we find a remarkable identity in the genera of the Tertiaries and of the surrounding deep sea, as can easily be seen by comparing the Tertiary West Indies types² of *Cidaris*, of *Echinolampas*, of *Agassizia*, of *Brissopsis*, of *Schizaster*, of *Eupatagus*, of *Peripneustes* (*Meoma*), of *Hemiaster*, of *Conoclypus*, and of *Echinanthus*, with the species of the same genera now found in the deep waters of the Caribbean Sea and Gulf of Mexico. The presence of Clypeastroids in the Tertiaries of the Mediterranean and Western France forms the connection which once must have existed between the American Clypeastroids and those still found on the West Coast of Africa, and extending from the Red Sea to the Western edge of the Pacific realm. A trace of this old connection is still shown at the present day in the existence of a species of *Mellita* and of *Moira* in the Red Sea.

Forbes, in his Monograph of the Echinodermata of the British Tertiaries, has figured under the name of *Echinarachnius Woodii* two species, one of which is probably a *Rhynchopygus* or a very flat *Nucleolites*; the other, a genus closely allied to one of our deep-sea *Pourtalesia*; it has the peculiar snout, thus far known only in that group. The relationship of the species of the older crag to the southern and eastern types was already then insisted upon by Forbes; while the newer crag manifests a more definite connection with the present Fauna of Great Britain, and in the Pleistocene of Norway and North America we find the common *Strongylocentrotus dröbachiensis*, which is truly an Arctic and boreal species, both in the Atlantic and Pacific Ocean.

Laube³ describes from the Tertiary beds of Austrian-Hungary a species of *Schizaster*

¹ A similar westward extension of the Tertiary corals of Sicily has been shown by M. Pourtalès, who also finds Tertiary Sicilian corals still living in the deep waters of the Caribbean Sea.

² See principally Cotteau, *Echinides d'Anguilla*; Guppy, *West India Tertiaries*.

³ Dr Gustav C. Laube, *Die Echinoiden der Oesterreichisch-Ungarischen oberen Tertiärlagerungen* K. K. Geol. Reichs Anstalt, Abhandl., v. Heft, No. 3, 1871.