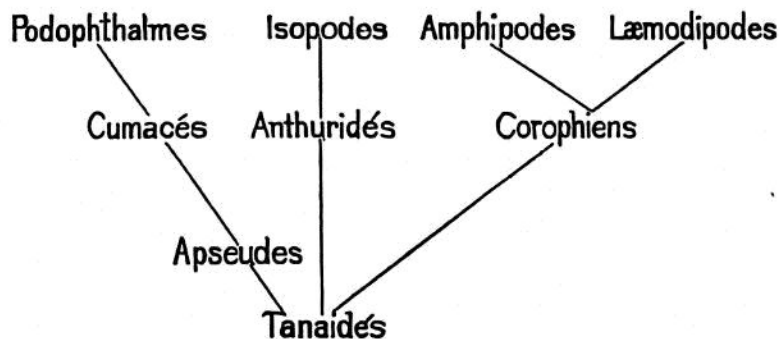


investigation employed, a historical review is drawn up of the results obtained or errors committed by previous writers on this branch of research, and after a careful record of Dr. Delage's own observations, a graphic representation is submitted of the affinities between different groups of Crustacea to which those observations seem to point:—



Dr. Delage confirms the view of Fritz Müller that the number of lateral slits in the Amphipodan heart consists, with rare exceptions, of three pairs [without, however, noticing that la Valette had already in 1857 plainly stated this fact in regard to *Gammarus puteanus*, and that Spence Bate, *Sessile-eyed Crustacea*, vol. i. p. xxxii., 1868, describes the course of the blood in the Amphipoda returning to the heart, "which it enters by three lateral pulsating oblique apertures"]; he gives G. O. Sars the credit of having first clearly indicated the existence of a posterior aorta with definite walls; he finds that Wrześniowski has recognised the existence of the hinder cardio-aortic valve; has described exactly the lower aorta with its termination in the hinder part of the ventral sinus by three openings, two lateral and one terminal; has described the course and branches of the upper aorta, but without seeing the valve that separates it from the heart, or the pericerebral vascular ring; has been the first to recognise that the blood which circulates in the appendages is contained in true vessels, and, lastly, has had a glimpse of the pericardium, since he speaks of a venous cavity above the heart. [In the *Zoologischer Anzeiger* for 1879 Wrześniowski very minutely describes the valve apparatus at both extremities of the heart.] Delage believes himself to have proved by injections that, in the principal joints of the legs, instead of occupying half the total breadth, leaving the other half to the venous current, the arterial vessels wind, perfectly rounded and defined, between the muscles, only communicating here and there with the corresponding venous vessels, which are also on their part perfectly individualised. He therefore rejects the view that the cavity of each limb is simply subdivided into two compartments by a single longitudinal membrane. His further discoveries concern the existence of the anterior cardio-pericardiac valve [already known to Wrześniowski], a pericardium with perfectly definite and continuous walls, a peri-oesophageal vascular collar formed by two branches of the anterior aorta, and a vascular ring formed by the aorta round the brain, a ring characteristic alike of the Amphipoda and the Læmodipoda. His observations were made principally on *Talitrus locusta*, Latr., *Gammarus locusta*, Fabr., in both of which the lateral orifices of the heart are found in the second, third and fourth segments of the peræon; on *Montagua monoculoides*, Sp. Bate, in which he could not discover an orifice in the second segment; and on *Corophium longicorne*, Latr., in which there is but one pair of lateral orifices, situated in the fourth segment. The Corophinæ are separated from the (other) Amphipoda, not only by this distinction, but also by the absence of two vessels proceeding from the upper extremity of the heart and designated "facial arteries," as well as by the absence of a vascular ring round the so-called "renal organ," and by the circumstances that the lower aorta is not terminally divided, and that the pericardium, instead of occupying the whole length of the body, is limited to the peræon.