

## DIAGRAM OF THE DEVELOPMENT OF ANIMALS BY KÖLLIKER.

KÖLLIKER, (A.) in his *Entwicklungsgeschichte der Cephalopoden*, Zurich, 1844, 1 vol. 4to., p. 175, has submitted the following diagram of the development of the animal kingdom.

- A. The embryo arises from a primitive part. (*Evolutio ex una parte.*)
  - 1°. It grows in two directions, with bilateral symmetry. (*Evolutio bigemina.*)
    - a. The dorsal plates close up. *Vertebrata.*
    - b. The dorsal plates remain open and are transformed into limbs. *Articulata.*
  - 2°. It grows uniformly in every direction. (*Evolutio radiata.*) And
    - a. Incloses the embryonal vesicle entirely.
      - α. This takes place very early. *Gasteropoda* and *Acophala.*
      - β. This takes place late. (Temporary vitelline sac.) *Limax.*
    - b. Contracts above the embryonal vesicle. (Genuine vitelline sac.) *Cephalopoda.*
- A. The whole body of the embryo arises simultaneously. (*Evolutio ex omnibus partibus.*)
  - 1°. It grows in the direction of its transverse axis,
    - a. With its hind body. *Radiata.* (*Echinoderms.*)
    - b. With the fore body, and
      - α. The hind body does not grow. *Acalephs.*
      - β. The hind body grows longitudinally. *Polypi.*
  - 2°. It grows in the direction of its longitudinal axis. *Worms.*

I have already shown how unnatural a zoölogical system must be which is based upon a distinction between total or partial segmentation of the yolk.<sup>1</sup> No more can a diagram of the development of animals, which adopts this difference as fundamental, be true to nature, even though it is based upon real facts. We ought never to single out isolated features, by which animals may be united or separated, as most anatomists do; our aim should rather be to ascertain their general relations, as Cuvier and K. E. von Baer have so beautifully shown.<sup>2</sup> I think also, that the homology of the limbs of *Articulata* and the dorsal plates of *Vertebrata* is more than questionable. The distinction, introduced between *Polyps* and *Acalephs* and these and the other *Radiates*, is not any better founded. It seems also quite inappropriate to call the development of Mollusks, *evolutio radiata*, especially after Baer had designated, under that same name, the mode of formation of the branch of *Radiates*, for which it is far better adapted.

<sup>1</sup> Chap. III., Sect. 1, p. 171.

<sup>2</sup> The principles of classification advocated by Baer are so clearly expressed by him, that I cannot resist the temptation of quoting some passages from the paper already mentioned above, p. 224, especially now, when I feel called upon to oppose the views of one of his most distinguished colleagues. "Vor allen Dingen muss man, um eine richtige Einsicht in die

gegenseitige Verwandtschaft der Thiere zu erlangen, die verschiedenen Organisationstypen von den verschiedenen Stufen der Ausbildung stets unterscheiden. Dass man diesen Unterschied gewöhnlich nicht im Auge behalten hat, scheint uns zu den sonderbarsten Zusammenstellungen geführt zu haben." Beiträge, etc., *Acta Nova*, vol. 13, p. 739.