

graphic nerve and contractile muscle; and these are produced and maintained to subserve its psychical endowments of sensation and voluntary motion.

This being the general and essential nature of the animal, type or pattern may be discovered in any one of these three leading peculiarities: in the psychical nature of the animal; in the arrangement of its nerve and muscle, or, subordinate to them, in the arrangement of the hard parts which protect the former or serve for the attachment of the latter; or lastly, in that of the apparatus employed for nutrition, respiration and circulation. It must happen, that, to a certain extent, these will agree as grounds of arrangement. Thus if the nerve matter be arranged on a given plan, this must indicate something corresponding in the psychical endowments, and may probably require something corresponding in the apparatus for motion, protection, and nutrition. Still, some of these points may be more important than others. For instance, psychical characters, not being material, cannot be accurately measured; apparatus for nutrition has a broad similarity amounting almost to general identity of plan, over the whole animal kingdom, while again it is subject to modification in nearly related species, intended to consume different articles of food. For such reasons, when we study the types of animals, we prefer to take as our chief guide that part of the physical structure which is most independent of the accidents of outward relations, and which is most nearly connected with the intelligence, which is the essence of the animal. Hence Agassiz very justly traces the old division of Aristotle into *enaima* and *anaima*, and that of Lamarck into *vertebrata* and *invertebrata*; not so much to the perceived difference in blood or skeleton, as to the perception, perhaps unconsciously, that there is an essential difference between the plans of structure in those animals that have the nervous matter protected in separate cavities of skull and spinal column, and those that have it confounded, as it were, with the organs of vegetative life. Hence also Cuvier, examining more minutely the nature and value of these differences, proposed the four branches of the Vertebrata, Mollusca, Articulata and Radiata, based on the arrangement of the structures protective of the nervous matter or subserving voluntary motion. Hence also Owen, penetrating more deeply into the real philosophy of the subject, names these branches from the arrangement of the nerve matter itself, *Myelencephala*, *Heterogangliata*, *Homogangliata*, and *Nematoneura*;