exercised. Serpents drag themselves along with difficulty over glass or any polished body, but make their way with great alacrity over any earthy irregular surface, or through tangled vegetation. For the exercise of these movements it is of course necessary that the bones and muscles should be fitly disposed ; and every one who has examined a pro­perly prepared serpent, must have been struck at once by the multiplicity and uniformity of its parts. The ribs and vertebrae are almost all alike in their formation, and it is only towards the caudal extremity that the bones diminish in bulk.

As all the vertebrae of serpents carry ribs, the usual dis­tinctions of cervical, dorsal, and lumbar, do not exist ; and it follows, that the number of ribs always corresponds to that of vertebrae. Moreover, as the scaly articulations of the skin always correspond to the ribs, which are their levers, so the number of abdominal plates agrees with the amount of ribs and vertebrae. This number varies not only with the species, but the individuals, and to so surprising an extent, that we not unfrequently find a difference in the same species, amounting to thirty or even fifty vertebrae. The number of vertebrae of the body, properly so called, rarely exceeds 300, and is never fewer than 100; the ver­tebrae of the tail, on the contrary, are sometimes reduced to five, although in other cases they amount to from 150 to 200. The ribs are more numerous in serpents than in any other class of created beings, several having above 500,— that is 250, or upwards, on each side of the spinal column. We here figure the skeleton of the common ringed snake of England,—*Tropidonotus natrix.* See Plate CCCCXL1V. fig. 2.

The muscles exhibit various modifications in the different species. In some they are remarkable for their consider­able size, and for the extraordinary development of tendons, especially among the venomous kinds. This organization is necessary for the production of that force and energy with which their undulating movements are often executed. The muscles which produce these effects are situate along the sides of the back, and on the anterior face of the ver­tebrae ; but as the ribs likewise exercise the function of lo­comotive organs, the numerous muscles which are attached to these parts greatly facilitate the lateral movements. The muscles of serpents being greatly interlaced, it becomes difficult to describe them singly, and their comparison with analogous parts in the higher orders is by no means easy. These anatomical details, however, are not to be expected in the present publication. We therefore refer the reader to the works of Horae,@@1 Hübner,@@2 Dugès,@@3 Duvernoy,@@4 Meckel,@@i and Schlegel.@@8

The muscles of serpents, as of other reptiles, preserve their irritability for a long time after what we may regard as the actual death of the animal ; for these creatures, although deprived of their head, and divested of their skin, will con­tinue to exhibit muscular movements for several weeks, if kept in a moist condition. Swammerdam, in his *Biblia Naturæ,* has proved, both by his figures and descriptions of frogs, that even at that early period (1666), that peculiar galvanic effect was demonstrated in the muscles of these reptiles, which at a future period gave rise to such important discoveries regarding the phenomena of Voltaic electricity.

A few words may he said regarding the supposed vestiges of the hinder extremities observable in certain serpents. Several species exhibit on each side of the anus a small hook or crotchet, half concealed by scales. The existence of these parts has been long recognised, but we believe it is to Professor Mayer of Bonn that we owe a more precise know­

ledge of their nature. The only Ophidian genera in which they have been hitherto precisely observed, are *Tortrix, Py­thon,* and *Boa.* They are most developed among the Boas, and the huge size of these reptiles admits of a more satis­factory examination. (See Plate CCCCXLIV. figs. 1, la, and 15.) These vestiges, then, consist of an assemblage on each side, of three principal osseous pieces, and of two small accessory portions attached at the point of articulation of the tibia and tarsus. The terminal bone, which alone ap­pears externally, is in the form of a crotchet, covered by a hard and scaly skin. When a longitudinal incision is made in the flesh, we find that the interior piece, which is the most developed, more or less S shaped, and comparable to the tibia, is prolonged with its free extremity into the ab­dominal cavity. The middle portion, on the contrary, which seems to represent the tarsus, is thick, short, slightly arched, and completely concealed within the flesh. This apparatus is moved by flexor and extensor muscles of a sufficiently simple structure. The use of these vestiges of the poste­rior members is still unknown. Their feeble development debars the idea of their contributing in any way to locomo­tion. Certain observers maintain that they are prehensile organs, which give firmness of position on whatever bodies are embraced by the circumvolutions of the tail and trunk ; or that they may even subserve the generative process. They exist in both sexes.

When in a state of entire repose, the majority of ser­pents love to roll themselves into a spiral mass, with the head in the centre, slightly raised above the other portions. Pos­sessing the power of bending their bodies in almost all di­rections, we at the same time frequently find them simply extended on the ground or herbage in a sinuous curve. To produce progressive motion, they merely unrol the body, and bending it into successive lateral sinuosities, bring into play the numerous points of contact presented by the an­terior extremities of the ribs, and thus push along with great facility. These reptiles are frequently observed to raise the anterior portion of their body into an erect posi­tion, supporting themselves on the tail and part of the ab­domen, as if with a view to survey the scene around them. The body, itself, is then usually quite stiff and straight, al­though some assume a more curved attitude, besides ex­hibiting a peculiar swelling or enlargement of the neck. When suspended perpendicularly from the branch of a tree, the great Boas exhibit scarcely any sign of life or mo­tion. They descend simply by dropping themselves down­wards, their peculiar form and great elasticity of structure preventing their receiving any injury from the fall ; and when they reach the ground, this rapid movement, so far from proving hurtful, aids by its impulsion their terrestrial progress.

Frequent mention has been made by vague observers, of serpents which could execute a retrograde movement,— gliding backwards as easily as in an ordinary direction. This fact has not been established on the authority of any instruct­ed naturalist, and may well be doubted, notwithstanding what the ancients have said of the Amphisbæna *(αμφὶς* and *βαίvειv, marching both wags),* a reptile alleged to have a head at either end, and supposed to be endowed with the faculty of progressing in both directions.@@7 The name, originally ap­plied to a species of the ancient world, probably the *Brgx,* has been erroneously bestowed by modern naturalists (fol­lowing the example of the Portuguese) on a tribe of serpents peculiar to America,—a country which knew not Aristotle.

The majority of serpents (both of the innocent and the colubriform venomous kinds) defend themselves against the

*@@@1 Phil. Trans,* vol. X. ; and *Lectures on Comp. Anat.*

*@@@, De Organis motoriis Boa canina.*

*@@@ Ann. des Seiences Λ'at.* vol. xii.

*@@@« Ibid.*

*@@@i Vergt. Anat.* vol. iii. p. 130, et suiv.

*@@@0 Physiognomie des Serpens,* vol. i. p. 18.

*@@@7 Pim.* 8. 35i *Æiian,* 9. 23.