

DIRECTIONS to the BINDER.

- Place Plate III. between page 154 and page 155.  
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GENERAL HISTORY  
OF  
ANIMALS.

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CHAPTER I.

*Analogies between Animals and Vegetables.*

**A**MONG the numberless objects with which the surface of this globe is covered and peopled, animals hold the first rank, both on account of the relation they bear to man, and of their acknowledged superiority over vegetable and inanimated matter. The senses, the figure, and the motions of animals, bestow on them a more extensive connection with surrounding objects than is possessed by vegetables. The latter, however, from their expansion, their growth, and the variety of parts of which they are composed, are more intimately related to external objects than minerals or stones, which are perfectly inert, and deprived of every vital or active principle.

principle. It is this number of relations alone which renders the animal superior to the vegetable, and the vegetable to the mineral. Man, if we estimate him by his material part alone, is superior to the brute creation only from the number of peculiar relations he enjoys by means of his hand and of his tongue; and, though all the operations of the Omnipotent are in themselves equally perfect, the animated being, according to our mode of perception, is the most complete; and man is the most finished and perfect animal.

What a variety of springs, of powers, and of mechanical movements, are included in that small portion of matter, of which the body of an animal is composed! What a number of relations, what harmony, what correspondence, among the different parts! How many combinations, arrangements, causes, effects, and principles, all conspiring to accomplish the same design! Of these we know nothing but by their results, which are so difficult to comprehend, that they cease only to be miraculous from our habits of inattention and our want of reflection.

But, however admirable this work may appear, the greatest miracle is not exhibited in the individual. It is in the successive renovation, and in the continued duration of the species, that Nature assumes an aspect altogether inconceivable and astonishing. This faculty of reproduction,

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duction\*, which is peculiar to animals and vegetables; this species of unity which always subsists, and seems to be eternal; this generative power, which is perpetually in action, must, with regard to us, continue to be a mystery so profound, that we shall probably never reach its bottom.

Even inanimated bodies, the stones or the dust under our feet, have some properties; their very existence presupposes a great number; and matter, the most imperfectly organized, possesses many relations with the other parts of the universe. We will not assert, as some philosophers have done, that matter, under whatever form it appears, is conscious of its existence and of its relative powers. This question belongs to metaphysics, of which we intend not to treat. We shall only remark, that, being ignorant of the extent of our own connections with external objects, we cannot hesitate in pronouncing inanimated matter to be infinitely more ignorant. Besides, as our sensations have not the most distant resemblance to the causes which produce them, analogy obliges us to conclude, that dead matter is neither endowed with sentiment, with sensation, nor with a consciousness of its own existence. Hence, to attribute any of

\* This word is frequently used by the author, and requires to be explained. It signifies the power of producing or propagating in general, and is equally applicable to plants and to animals. Generation is a species of reproduction peculiar to animated beings.

these faculties to matter, would be ascribing to it the power of thinking, of acting, and of perceiving, nearly in the same manner as we ourselves think, act, and perceive; which is equally repugnant to reason and religion.

With inanimated matter, therefore, though formed of dust and clay, we have no other relations than what arise from the general properties of bodies, such as, extension, impenetrability, gravity, &c. But, as relations purely material make no internal impression on us, and, as they exist entirely independent of us, they cannot be considered as any part of our being. Our existence, therefore, is an effect of organization, of life, of the soul. Matter, in this view, is not a principal, but an accessory. It is a foreign covering, united to us in a manner unknown; and its presence is noxious. Thought is the constituent principle of our being, and is perhaps totally independent of matter.

We exist, then, without knowing how; and we think, without perceiving the reason of thought. But, whatever be the mode of our being, or of our thinking, whether our sensations be real or apparent, their effects are not the less certain. The train of our ideas, though different from the objects which occasion them, gives rise to genuine affections, and produces in us relations to external objects, which we may regard as real, because they are uniform and invariable. Thus, agreeable to the nature of our being,

being, it is impossible to doubt concerning the reality of those distinctions and resemblances which we perceive in the bodies that surround us. We may, therefore, conclude, without hesitation, that man holds the first rank in the order of nature, and that brute animals hold the second, vegetables the third, and minerals the last. Though we are unable clearly to distinguish between our animal and spiritual qualities; though brutes are endowed with the same senses, the same principles of life and motion, and perform many actions in a manner similar to those of man; yet they have not the same extent of relation to external objects; and, consequently, their resemblance to us fails in numberless particulars. We differ still more from vegetables; but we are more analogous to them than to minerals; for vegetables possess a species of animated organization; but minerals have nothing that approaches to regular organs.

Before we give the history of an animal, it is necessary to have an exact knowledge of the general order of his peculiar relations, and then to distinguish those relations which he enjoys equally with vegetables and minerals. An animal possesses nothing common to the mineral but the general properties of matter: His nature and economy, however, are perfectly different. The mineral is inactive, insensible, subject to every impulse, without organization, or the power of reproduction, a rude mass fitted only to be trode by the feet of men and of animals.

Even the most precious metals, which derive their value from the conventions of men only, are regarded in no other light by the philosopher. In the animal, the whole powers of nature are united. The principles with which he is animated are peculiar to him: He wills; he determines; he acts; he communicates, by his senses, with the most distant objects; his body is a world in miniature, a central point to which every thing in the universe is connected. These are his peculiar and invariable relations: The faculties of growth and expansion, of reproduction and the multiplication of his species, he possesses in common with the vegetable kingdom.

Progressive motion appears to be the most distinguishing quality between an animal and a vegetable. We, indeed, know no vegetable that enjoys a loco-motive faculty. But this motion is denied to several species of animals, as oysters\*, gall-insects, &c. This distinction, therefore, is neither general nor essential.

Sensation more essentially distinguishes animals from vegetables. But *sensation* is a complex idea, and requires some explication; for, if sensation implied no more than motion consequent upon a stroke or impulse, the sensitive plant enjoys this power. But, if by sensation we mean the faculty of perceiving and of comparing ideas, it is uncertain whether brute ani-

\* This is not strictly true; for oysters, and even gall-insects, are capable of a degree of local motion.

imals

mals are endowed with this faculty. If it should be allowed to dogs, elephants, &c. whose actions seem to proceed from motives similar to those by which men are actuated, it must be denied to many species of animals, particularly to those that appear not to possess the faculty of progressive motion. If the sensation of an oyster, for example, differ in degree only from that of a dog, why do we not ascribe the same sensation to vegetables, though in a degree still inferior? This distinction, therefore, between the animal and vegetable, is neither sufficiently general nor decided.

A third distinction has been derived from the manner of feeding. Animals have organs of apprehension by which they lay hold of their food; they search for pasture, and have a choice in their aliment. But plants are under the necessity of receiving such nourishment as the soil affords them, without exerting any choice in the species of their food, or in the manner of acquiring it: The moisture of the earth is the only source of their nourishment. However, if we attend to the organization and action of the roots and leaves, we shall soon be convinced, that these are the external organs by which vegetables are enabled to extract their food; that the roots turn aside from a vein of bad earth, or from any obstacle which they meet with, in search of a better soil; and that they split and separate their fibres in different directions, and

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even change their form, in order to procure nourishment to the plant. A general distinction, therefore, between the animal and vegetable, cannot be founded on their manner of feeding.

From this investigation we are led to conclude, that there is no absolute and essential distinction between the animal and vegetable kingdoms; but that Nature proceeds by imperceptible degrees from the most perfect to the most imperfect animal, and from that to the vegetable: Hence the fresh water polypus may be regarded as the last of animals, and the first of plants.

After examining the distinctions, we shall now inquire into the resemblances which take place between animals and vegetables. The power of reproduction is common to the two kingdoms, and is an analogy both universal and essential. This mutual faculty would induce us to think that animals and vegetables are beings of the same order.

A second resemblance may be derived from the expansion of their parts, which is likewise a common property; for vegetables grow as well as animals; and, though some difference in the manner of expansion may be remarked, it is neither general nor essential; since the growth of some considerable parts of animals, as the bones, the hairs, the nails, the horns, &c. is the effect of a genuine vegetation; and the fetus in its first formation, may be rather said to vegetate than to live.

A third resemblance arises from the following fact: Some animals are propagated in the same manner, and by the same means, as vegetables. The multiplication of the vine-fretter (*puceron*), which is effected without copulation, is similar to that of plants by seed; and the multiplication of the polypus by cuttings resembles that of plants by slips.

We may, therefore, conclude, with more certainty, that animals and vegetables are beings of the same order, and that Nature passes from the one to the other by imperceptible degrees; since the properties in which they resemble each other are universal and essential, while those by which they are distinguished are limited and partial.

Let us next compare animals and vegetables in different points of view; for example, with regard to number, situation, magnitude, figure, &c. from which new inductions will arise.

Animals exceed plants in the number of species. In the class of insects alone, there are, perhaps, a greater number of species, than of the whole species of plants on the face of the earth. Animals differ from each other much more than plants: It is the great similarity of plants that has given rise to the difficulty of distinguishing and arranging them, and to the variety of botanical systems, which are much more numerous than those of zoology.



Beside being more strongly characterised, every species of animal is distinguishable from another by copulation. Those may be regarded as of the same species which, by copulation, uniformly produce and perpetuate beings every way similar to their parents; and those which, by the same means, either produce nothing, or dissimilar beings, may be considered as of different species. A fox, for example, will be of a different species from a dog, if nothing results from the intercourse of a male and a female of these two animals; or, if the result be a dissimilar creature, a kind of mule, as this mule cannot multiply, it will be a sufficient demonstration that the fox and dog are different species of animals. In plants, we have not the same advantage; for, though sexes have been attributed to them, and generic distinctions have been founded on the parts of fructification; yet, as these characteristics are neither so certain nor so apparent as in animals; and, as the reproduction of plants can be accomplished by several methods which have no dependence on sexes, or the parts of fructification, this opinion has not been universally received; and it is only by the misapplication of analogy, that the sexual system has been pretended to be sufficient to enable us to distinguish the different species of the vegetable kingdom.

Though the species of animals be more numerous than those of plants, the number of individuals

viduals in each species of the latter far exceed those of the former. In animals, as well as in plants, the number of individuals is much greater in the small than in the large kinds. Flies are infinitely more numerous than elephants; and there are more herbs than trees. But, if we compare the number of individuals in each species, the individuals in each species of plant far exceed those of the animal. Quadrupeds, for example, produce but few at a time, and at considerable intervals. Trees, on the contrary, produce annually an amazing number of seeds. It may be alleged, that to render this comparison exact, the number of seeds produced by a tree should be compared with the number of germs contained in the semen of an animal; and then, perhaps, it would appear, that animals abound more in germs than vegetables. But, by collecting and sowing the seeds of a single elm tree, 100,000 young elms may be raised from the product of one year. Though a horse, however, were furnished with all the mares he could cover in a year, the result between the production of the animal and of the plant would be very different. I avoid taking notice of the number of germs; because of these, especially in the animal, we have no certain knowledge, and because the same seminal germs may exist in the vegetable; for the seed of a plant is not a germ, but a production as perfect as the fetus of an animal, and which,

which, like a foetus, requires only the expansion of its parts.

To this may be opposed the prodigious multiplication of some kinds of insects, as the bee, a single female of which will produce 30 or 40 thousand. But, it ought to be remarked, that I am here speaking in general of animals compared with vegetables. Besides, the bee, which affords, perhaps, an example of the greatest multiplication among animals, proves nothing against the present doctrine; for, out of 30 or 40 thousand flies produced by the mother-bee, there are but very few females, and no less than 1500 or 2000 males: The rest are of neither sex, and totally incapable of procreating.

It must be acknowledged, that some species of insects, fishes, and shell-animals, appear to be extremely prolific. Oysters, herrings, fleas, &c. are perhaps equally fertile as mosses, and the most common plants. But, in general, most species of animals are less prolific than plants; and, upon comparing the multiplication of the different species of plants, we find not such remarkable differences, with regard to number, as take place among animals. Some animals produce great numbers, and others very few. But, in every species of plants, the quantity produced is always great.

From what we have already observed, it appears, that, both in the animal and vegetable kingdoms, the smallest and most contemptible species

species are the most prolific. In proportion as animals seem to be more perfect, the number of individuals decreases. Does the production of particular forms of body, necessary for the perfecting of sentiment, as those of quadrupeds, and of birds, cost Nature more expence of organic particles than the production of inferior creatures?

Let us now compare animals and vegetables with regard to situation, size, and figure. Vegetables can exist no where but on the earth. Most of them are attached to the soil by roots. Some, as truffles, are entirely covered with the soil; and a few grow under water. But the whole require a connection with the surface of the earth. Animals, on the contrary, are more generally diffused. Some inhabit the surface, and others the interior parts of the earth. Some never rise above the bottom of the ocean, and others swim in the waters. The air, the internal parts of plants, the bodies of men and of other animals, and even stones themselves, are stored with inhabitants.

By the assistance of the microscope, many new species of animals have been discovered. But, what is singular, we are not indebted to this instrument for above one or two species of plants. The small moss, of which mouldiness consists, is perhaps the only microscopic plant that has been described. From this it would appear, that Nature has refused existence to very small plants,  
while

while she has created animalcules in the greatest profusion. But this opinion should not be adopted without examination. Plants are so similar in their structure, that it is much more difficult to distinguish them than animals. This mouldiness, which we imagine to be only a very small moss, may be a forest or a garden consisting of a multitude of different plants, though we are unable to distinguish them.

Animals and vegetables differ also with regard to size. There is a greater disproportion between the bulk of a whale and that of one of these pretended microscopic animals, than between the largest oak and the small moss mentioned above. Though bulk be only a relative attribute, it may be useful to know the limits within which Nature has confined her productions. As to largeness, plants differ but little from animals. The quantity of matter in a whale and in a large tree is nearly equal; but, as to smallness, some men have pretended to have seen animals so extremely minute, that a million of them collected in a heap would not equal the small moss on a piece of mouldy bread.

The most general and most obvious distinction between plants and animals arises from their figure. The form of animals, though infinitely various, has no resemblance to that of plants: And, though the polypi, which, like plants, can be multiplied by cuttings, may be regarded as the link which connects the animal and vegetable

table kingdoms, not only from the manner of their reproduction, but still more from their figure; yet there is no danger of mistaking the one for the other. The operations of some animals resemble plants or flowers. But plants never produce any thing similar to an animal; and those wonderful insects which make corals, would never have been mistaken for flowers, if, by a foolish prejudice, coral had not been regarded as a plant. Thus the errors we may commit in comparing plants and animals, are confined to a few objects which lie on the extremities of the two kingdoms; and the farther we extend our observations, we shall be the more convinced, that the Creator has instituted no fixed limits between the animal and vegetable; that these two species of organized beings possess a greater number of common properties than of real differences; that the production of an animal requires, perhaps, a smaller exertion of Nature than the production of a vegetable; or, rather, that the production of organized bodies requires no immediate exertion at all; and, lastly, that animation, or the principle of life, instead of a metaphysical step in the scale of being, is a physical property common to all matter.