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978-1-108-00166-3 - The Philosophy of Zoology: Or a General View of the Structure, Functions, and Classification of Animals, Volume 2

John Fleming

Excerpt

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THE
PHILOSOPHY
OF
ZOOLOGY.



THE observations which we have ventured to offer in the former volume, relate to what may be termed the Motive, the Sentient, the Nutritive, and Reproductive Functions of Animals. The various Organs of the animal frame have been described, their actions investigated, and the important purposes of life, to which they are subservient, have at the same time been pointed out. An equally extensive field of Zoological Science remains to be investigated.

Animals are related to one another, and to the objects which surround them, in such a manner, as to be dependent on a variety of circumstances for the preservation of their existence, their dispersion over the globe, and their power of accommodation to the changes of the seasons. They are likewise to be viewed as admitting of division into classes and subordinate groups, according to the external or internal characters which they exhibit. In the investigation of these characters, a variety of methods are em-

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ployed, and many rules have been prescribed, to regulate the principles of zoological nomenclature.

In order to enter more fully into these important subjects, we shall distribute the present volume into Four Parts. In the first, we shall consider the Condition of Animals in reference to their Duration, Distribution, and Economical Uses. In the second, we shall treat of the Methods of Investigation employed to ascertain their structure and actions. In the third, we shall examine the Rules of Nomenclature ; while the fourth will embrace a General View of the Classification of the Objects of the Animal Kingdom.

 PART FIRST.

ON THE CONDITION OF ANIMALS.

 CHAP. I.

ON THE DURATION OF ANIMALS.

EACH species of Animal is destined, in the absence of disease and accidents, to enjoy existence during a particular period. In no species, however, is this term absolutely limited, as we find some individuals outliving others, by a considerable fraction of their whole life. In order to find the ordinary duration of life of any species, therefore, we

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must take the average of the lives of a number of individuals, and rest satisfied with the approximation to truth which can thus be obtained.

There is but little resemblance, in respect of longevity, between the different classes, or even species of animals. There is no peculiar structure, by which long-lived species may be distinguished from those which are short-lived. Many species, whose structure is complicated; live but for a few years, as the rabbit; while some of the testaceous mollusca, with more simple organization, have a more extended existence. If longevity is not influenced by structure, neither is it modified by the size of the species. While the horse, greatly larger than the dog, lives to twice its age, man enjoys an existence three times longer than the former.

The circumstances which regulate the term of existence in different species, exhibit so many peculiarities, corresponding to each, that it is difficult to offer any general observations on the subject. Health is precarious, and the origin of diseases generally involved in obscurity. The condition of the organs of respiration and digestion, however, appears so intimately connected with the comfortable continuance of life, and the attainment of old age, that existence may be said to depend on the due exercise of the functions which they perform.

Whether animals have their blood aerated by means of lungs or gills, they require a regular supply of oxygen gas. But as this gas is extensively consumed in the processes of combustion, putrefaction, vegetation and respiration, there is occasionally a deficiency in particular places for the supply of animal life. But, in general, where there is a deficiency of oxygen, there is also a quantity of carbonic acid or carburetted hydrogen present. These gases not only injure the system by occupying the place of

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the oxygen which is required, but exercise on many species a deleterious influence. To these circumstances may be referred the difficulty of preserving many fishes and aquatic mollusca in glass jars or small ponds; as a great deal of the oxygen in the air contained in the water, is necessarily consumed by the germination and growth of the aquatic cryptogamia, and the respiration of the infusory animalcula. In all cases, when the air of the atmosphere, or that which the water contains, is impregnated with noxious particles, many individuals of a particular species, living in the same district, suffer at the same time. The disease which is thus at first endemic or local, may, by being contagious, extend its ravages to other districts.

The endemical and epidemical diseases which attack horses, sheep and cows, obtain in this country the name of *murrain*, sometimes also *the distemper*. The general term, however, for the pestilential diseases with which these and other animals are infected is Epizooty, (from ἐπί upon, and ζῷον an animal.

The ravages which have been committed among the domesticated animals, at various times, in Europe, by epizooties, have been detailed by a variety of authors. Horses, sheep, cows, swine, poultry, fish, have all been subject to such attacks; and it has frequently happened, that the circumstances which have produced the disease in one species have likewise exercised a similar influence over others.

That these diseases arise from the deranged functions of the respiratory organs, is rendered probable by the circumstance, that numerous individuals, and even species, are affected at the same time; and this opinion is strengthened, when the rapidity with which they spread is taken into consideration.

Many diseases, which greatly contribute to shorten life,

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take their rise from circumstances connected with the organs of digestion. Noxious food is frequently consumed by mistake, particularly by domesticated animals. When cows, which have been confined to the house, during the winter season, and fed with straw, are turned out to the pastures in the spring, they eat indiscriminately every green plant presented to them, and frequently fall victims to their imprudence. It is otherwise with animals in a wild state, whose instincts guard them from the common noxious substances of their ordinary situation.

The shortening of life, in consequence of the derangement of the digestive organs, is chiefly produced by a scarcity of food. When the supply is not sufficient to nourish the body, it becomes lean, the fat being absorbed to supply the deficiency,—feebleness is speedily exhibited,—the cutaneous and intestinal animals rapidly multiply, and, in conjunction, accelerate the downfall of the system.

The power of fasting, or of surviving without food, possessed by some animals, is astonishingly great. An eagle has been known to live without food five weeks,—a badger a month,—a dog thirty-six days,—a toad fourteen months, and a beetle three years. This power of outliving scarcity for a time, is of signal use to many animals, whose food cannot be readily obtained; as is the case with beasts of prey, and rapacious birds. But this faculty does not belong to such exclusively. Wild pigeons have survived twelve days, an antelope twenty days, and a land tortoise eighteen months. Such fasting, however, is detrimental to the system, and can only be considered as one of those singular resources which may be employed in cases where, without it, life would speedily be extinguished.

In situations where animals are deprived of their accustomed food, they frequently avoid the effects of starvation, by devouring substances to which their digestive organs are

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not adapted. Pigeons can be brought to feed on flesh, and hawks on bread. Sheep, when covered with snow, have been known to eat the wool off each other's backs.

The various diseases to which animals are subject, tend greatly to shorten the period of their existence. With the methods of cure employed by different species, we are but little acquainted. Few accurate observations appear to have been made on the subject. Dogs frequently effect a cure of their sores, by licking them. They eat grass to excite vomiting; and probably to cleanse their intestines from obstructions, or worms, by its mechanical effects. Many land animals promote their health by bathing, others by rolling themselves in the dust. By the last operation, they probably get rid of the parasitical insects with which they are infected.

But independent of scarcity, or disease, comparatively few animals live to the ordinary term of natural death. There is a wasteful war every where raging in the animal kingdom. Tribe is divided against tribe, and species against species, and neutrality is nowhere respected. Those which are preyed upon, have certain means which they employ to avoid the foe; but the rapacious are likewise qualified for the pursuit. The exercise of the feelings of benevolence may induce us to confine our attention to the former, and adore that goodness which gives shelter to the defenceless, and protection to the weak, while we may be disposed to turn, precipitately, from viewing the latter; lest we discover marks of cruelty, where we wished to contemplate nothing but kindness. These feelings are usually the companions of circumscribed and partial observation, and fall far short of the object at which they aim.

It would be impious in us to inquire why the waster has been created to destroy. It is enough if we know that rapacious animals occupy a station in the scale of being. And,

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while we eagerly explore the various methods employed by the defenceless, to secure themselves from danger, and evade the threatened death ; it is suitable for us likewise to contemplate the various means employed by carnivorous animals to gain the means of their subsistence. When we see a hawk in pursuit of a lark, we are apt to admire exclusively, the dexterity of the latter in avoiding destruction, and to triumph when it has obtained the requisite protection in a thicket. We seem to forget that the digestive organs of the hawk are fitted only for carrion ; and we lose sight of the benevolence and wisdom exhibited, in giving to its wings a power of inflicting a deadly blow, and rendering the claws suited for grasping, and the bill for tearing in pieces the quarry. We are not therefore to take confined views of the animal kingdom, if we wish to read the lessons concerning the Providence of God which it teaches. He that causeth the grass to grow for the cattle, and herb for the service of man ; likewise giveth meat in due season to the young lions which roar after their prey ; and feedeth the ravens, though they neither sow nor reap. We see rapacious and defenceless animals existing, yet we do not observe the former successful in extirpating the latter. Limits are assigned to the ravages of this universal war. The excess only of the population is cut off,—and this excess, on whose production so many animals depend for subsistence, is as uniform as the means used to restrain its limits.

These various circumstances which we have now enumerated as limiting the duration of animals, preserve the balance of life, restrain within suitable bounds the numbers of the individuals of a species, and give stability to that system, the wise arrangements of which can only be discovered by a close examination of the whole.

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CHAP. II.

ON THE DISTRIBUTION OF ANIMALS.

IN examining the zoological productions of different countries, we observe, that the species which are commonly met with in one district, are rare, or not to be detected, in the others. If we confine our attention to any one species, we shall observe, that there is some particular country where the individuals are most numerous, and where the energies of life are exerted with the greatest activity. As we recede from this district, the individuals become less numerous, their increase goes on at a slower rate, and those which are produced are rather of dwarfish stature: at length, we reach the limits beyond which they do not extend. The geographical distribution of each species, therefore, may be represented by a circle, towards the centre of which, existence can be comfortably maintained; but as we approach the circumference, restraints multiply, and life at last becomes impracticable. Each species has a range peculiar to itself, so that the circles of different species intersect one another in every possible relation.

The extent of the earth's surface over which the individuals of a species are dispersed, can only be ascertained after a long series of observations, conducted by naturalists in different countries. Hitherto the geographical limits of but few species have been satisfactorily determined. These chiefly belong to the larger species of quadrupeds, as the African and Asiatic elephants, the ass and the quagga, the lion, hippopotamus, and polar bear. In the tribes of the less perfect animals, the species of which have been investigated by few, the extent of their GEOGRAPHICAL DISTRIBUTION has been very imperfectly determined.

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TEMPERATURE.

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Before proceeding to the examination of the laws which regulate the geographical distribution of any one species, it is expedient that we previously make ourselves acquainted with the range of country it inhabits, the situations in which it has been observed, and the peculiar characters it exhibits in these different situations. But while this minute and varied information is requisite for the purpose of investigating fully the physical history of any one species, it is enough, for ordinary investigations, that we ascertain those districts and situations where the individuals are most healthy and most prolific, and those where they do not exist. By comparing the physical circumstances of the former with those of the latter, it will be no difficult matter to discover those conditions which promote the vigour of life in the one, and restrain or destroy its energies in the other. What, then, are those conditions which limit the geographical distribution of species? They appear to be limited to circumstances connected with Temperature, Food, Situation, and Foes,

I. TEMPERATURE.

We have already stated, that the degree of heat at the equatorial regions appears to be most favourable for the increase of living beings, and that they diminish in numbers as we approach the poles. There is no latitude, however, which the perseverance of man has yet reached, where living beings have not been observed. The icy shores of the arctic regions are peopled as well as the arid plains or shaded forests of tropical climates. When, however, an inhabitant of the colder regions is transported to a warmer district, the increased temperature is painful, the functions become deranged, and disease and death ensue. The inhabitants of the warmer regions, when transported to the colder districts, experience inconvenience from the change of tem-

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perature, equally hurtful to the system, and fatal to its continuance. The polar bear appears to be accommodated to live in a region, whose mean annual temperature is below the freezing point. In the summer temperature of Edinburgh, however well supplied with food, he appears to languish in misery. Cold spring-water poured upon him seems to revive him for a little; but all relief is temporary, the climate is too hot for the enjoyment of life. Destined to live in a climate where the system is required to secrete heat chiefly, it seems incapable of generating the cold requisite to counteract the effects of even a temperate climate. The inhabitants of the torrid regions, on the other hand, seem capable of generating cold chiefly, all their organs being adapted for resisting high temperatures; and hence, when brought to cold districts, they are incapable of generating the requisite degree of heat.

In those districts where the individuals of a species are most vigorous and prolific, the temperature most suitable for existence prevails. The native country of the horse is probably Arabia. There he exists in a wild state in the greatest numbers. In the Zetland Islands, where he is nearly in a state of nature, he is approaching the polar limits of his distribution. He has become a dwarf. He does not reach maturity until his fourth year, seldom continues in vigour beyond his twelfth, and the female is never pregnant above once in two years. At the line where the energies of the horse terminate, however, the rein-deer becomes a useful substitute. Its equatorial limits do not reach the shores of the Baltic.

The variations of the seasons, which bring along with them corresponding changes of heat and cold, exercise a powerful influence on the distribution of animals, in reference to temperature. Some species appear to possess a considerable range of temperature, within which life can be