CHAPTER XVII.

SECONDARY SEXUAL CHARACTERS OF MAMMALS.

WITH mammals the male appears to win the female much more through the law of battle than through the display of his charms. The most timid animals, not provided with any special weapons for fighting, engage in desperate conflicts during the season of love. Two male hares have been seen to fight together until one was killed; male moles often fight, and sometimes with fatal results; male squirrels engage in frequent contests, "and often wound each other severely"; as do male beavers, so that "hardly a skin is without scars."* I observed the same fact with the hides of the guanacoes in Patagonia; and on one occasion several were so absorbed in fighting that they fearlessly rushed close by me. Livingstone speaks of the males of the many animals in southern Africa as almost invariably shewing the scars received in former contests.

* See Waterton's account of two hares fighting, Zoologist, vol. i., 1843, p. 211. On moles, Bell, Hist. of British Quadrupeds, 1st ed., p. 100. On squirrels, Audubon and Bachman, Viviparous Quadrupeds of N. America, 1846, p. 269. On beavers, Mr. A. H. Green, in Journal of Linnean Society, Zoology, vol. x., 1869, p. 362.

The law of battle prevails with aquatic as with terrestrial mammals. It is notorious how desperately male seals fight, both with their teeth and claws, during the breeding-season; and their hides are likewise often covered with scars. Male sperm-whales are very jealous at this season; and in their battles "they often lock their jaws together, and turn on their sides and twist about"; so that their lower jaws often become distorted.*

* On the battles of seals, see Capt. C. Abbott in Proc. Zool. Soc., 1868, p. 191; Mr. R. Brown, ibid., 1868, p. 436; also L. Lloyd, Game Birds of Sweden, 1867, p. 414; also Pennant. On the sperm-whale see Mr. J. H. Thompson, in Proc. Zool. Soc., 1867, p. 246.

All male animals which are furnished with special weapons for fighting, are well known to engage in fierce battles. The courage and the desperate conflicts of stags have often been described; their skeletons have been found in various parts of the world, with the horns inextricably locked together, shewing how miserably the victor and vanquished had perished.* No animal in the world is so dangerous as an elephant in "must". Lord Tankerville has given me a graphic description of the battles between the wild bulls in Chillingham Park, the descendants, degenerated in size but not in courage, of the gigantic Bos primigenius. In 1861 several contended for mastery; and it was observed that two of the younger bulls attacked in concert the old leader of the herd, overthrew and disabled him, so that he was believed by the keepers to be lying mortally wounded in a neighbouring wood. But a few days afterwards one of the young bulls approached the wood alone; and then the "monarch of the chase," who had been lashing himself up for vengeance, came out and, in a short time, killed his antagonist. He then quietly joined the herd, and long held undisputed sway. Admiral Sir B. J. Sulivan informs me that, when he lived in the Falkland Islands, he imported a young English stallion, which frequented the hills near Port William with eight mares. On these hills there were two wild stallions, each with a small troop of mares; "and it is certain that these stallions would never have approached each other without fighting. Both had tried singly to fight the English horse and drive away his mares, but had failed. One day they came in together and attacked him. This was seen by the captain who had charge of the horses, and who, on riding to the spot, found one of the two stallions engaged with the English

horse, whilst the other was driving away the mares, and had already separated four from the rest. The captain settled the matter by driving the whole party into a corral, for the wild stallions would not leave the mares."

* See Scrope (Art of Deer-stalking, p. 17) on the locking of the horns with the Cervus elaphus. Richardson, in Fauna Bor. Americana, 1829, p. 252, says that the wapiti, moose, and reindeer have been found thus locked together. Sir. A. Smith found at the Cape of Good Hope the skeletons of two gnus in the same condition.

Male animals which are provided with efficient cutting or tearing teeth for the ordinary purposes of life, such as the Carnivora, Insectivora, and rodents, are seldom furnished with weapons especially adapted for fighting with their rivals. The case is very different with the males of many other animals. We see this in the horns of stags and of certain kinds of antelopes in which the females are hornless. With many animals the canine teeth in the upper or lower jaw, or in both, are much larger in the males than in the females, or are absent in the latter, with the exception sometimes of a hidden rudiment. Certain antelopes, the musk-deer, camel, horse, boar, various apes, seals, and the walrus, offer instances. In the females of the walrus the tusks are sometimes quite absent.* In the male elephant of India and in the male dugong*(2) the upper incisors form offensive weapons. In the male narwhal the left canine alone is developed into the well-known, spirally-twisted, so-called horn, which is sometimes from nine to ten feet in length. It is believed that the males use these horns for fighting together; for "an unbroken one can rarely be got, and occasionally one may be found with the point of another jammed into the broken place."*(3) The tooth on the opposite side of the head in the male consists of a rudiment about ten inches in length, which is embedded in the jaw; but sometimes, though rarely, both are equally developed on the two sides. In the female both are always rudimentary. The male cachalot has a larger head than that of the female, and it no doubt aids him in his aquatic battles. Lastly, the adult male Ornithorhynchus is provided with a remarkable apparatus, namely a spur on the foreleg, closely resembling the poison-fang of a venomous snake; but according to Harting, the secretion from the gland is not poisonous; and on the leg of the female there is a hollow, apparently for the reception of the spur.*(4)

* Mr. Lamont (Seasons with the Sea-Horses, 1861, p. 143) says that a good tusk of the male walrus weighs 4 pounds, and is longer than that of the female, which weighs about 3 pounds. The males are described as fighting ferociously. On the occasional absence of the tusks in the female, see Mr. R. Brown, Proceedings, Zoological Society, 1868, p. 429.

*(2) Owen, Anatomy of Vertebrates, vol. iii., p. 283.

*(3) Mr. R. Brown, in Proc. Zool. Soc., 1869, p. 553. See Prof. Turner, in Journal of Anat. and Phys., 1872, p. 76, on the homological nature of these tusks. Also Mr. J W. Clarke on two tusks being developed in the males, in Proceedings of the Zoological Society, 1871, p. 42.

*(4) Owen on the cachalot and Ornithorhynchus, ibid., vol. iii., pp. 638, 641. Harting is quoted by Dr. Zouteveen in the Dutch translation of this work, vol. ii., p. 292.

When the males are provided with weapons which in the females are absent, there can be hardly a doubt that these serve for fighting with other males; and that they were acquired through sexual selection, and were transmitted to the male sex alone. It is not probable, at least in most cases, that the females have been prevented from acquiring such weapons, on account of their being useless, superfluous, or in some way injurious. On the contrary, as they are often used by the

males for various purposes, more especially as a defence against their enemies, it is a surprising fact that they are so poorly developed, or quite absent, in the females of so many animals. With female deer the development during each recurrent season of great branching horns, and with female elephants the development of immense tusks, would be a great waste of vital power, supposing that they were of no use to the females. Consequently, they would have tended to be eliminated in the female through natural selection; that is, if the successive variations were limited in their transmission to the female sex, for otherwise the weapons of the males would have been injuriously affected, and this would have been a greater evil. On the whole, and from the consideration of the following facts, it seems probable that when the various weapons differ in the two sexes, this has generally depended on the kind of transmission which has prevailed.

As the reindeer is the one species in the whole family of deer, in which the female is furnished with horns, though they are somewhat smaller, thinner, and less branched than in the male, it might naturally be thought that, at least in this case, they must be of some special service to her. The female retains her horns from the time when they are fully developed, namely, in September, throughout the winter until April or May, when she brings forth her young. Mr. Crotch made particular enquiries for me in Norway, and it appears that the females at this season conceal themselves for about a fortnight in order to bring forth their young, and then reappear, generally hornless. In Nova Scotia, however, as I hear from Mr. H. Reeks, the female sometimes retains her horns longer. The male on the other hand casts his horns much earlier, towards the end of November. As both sexes have the same requirements and follow the same habits of life, and as the male is destitute of horns during the winter, it is improbable that they can be of any special service to the female during this season, which includes the larger part of the time during which she is horned. Nor is it probable that she can have inherited horns from some ancient progenitor of the family of deer, for, from the fact of the females of so many species in all quarters of the globe not having horns, we may conclude that this was the primordial character of the group.*

* On the structure and shedding of the horns of the reindeer, Hoffberg, Amaenitates Acad., vol. iv., 1788, p. 149. See Richardson, Fauna Bor. Americana,. p. 241, in regard to the American variety or species: also Major W. Ross King, The Sportsman in Canada, 1866, p. 80.

The horns of the reindeer are developed at a most unusually early age; but what the cause of this may be is not known. The effect has apparently been the transference of the horns to both sexes. We should bear in mind that horns are always transmitted through the female, and that she has a latent capacity for their development, as we see in old or diseased females.* Moreover the females of some other species of deer exhibit, either normally or occasionally, rudiments of horns; thus the female of Cervulus moschatus has "bristly tufts, ending in a knob, instead of a horn"; and "in most specimens of the female wapiti (Cervus canadensis) there is a sharp bony protuberance in the place of the horn."*(2) From these several considerations we may conclude that the possession of fairly well-developed horns by the female reindeer, is due to the males having first acquired them as weapons for fighting with other males; and secondarily to their development from some unknown cause at an unusually early age in the males, and their consequent transference to both sexes.

* Isidore Geoffroy St-Hilaire, Essais de Zoolog. Generale, 1841, p. 513. Other masculine characters, besides the horns, are sometimes similarly transferred to the female; thus Mr. Boner, in speaking of an old female chamois (Chamois Hunting in the Mountains of Bavaria, 1860, 2nd ed., p. 363), says, "not only was the head very male-looking,

but along the back there was a ridge of long hair, usually to be found only in bucks."

*(2) On the Cervulus, Dr. Gray, Catalogue of Mammalia in the British Museum, part iii., p. 220. On the Cervus canadensis or wapiti, see Hon. J. D. Caton, Ottawa Academy of Nat. Sciences, May, 1868, p. 9.

Turning to the sheath-horned ruminants: with antelopes a graduated series can be formed, beginning with species, the females of which are completely destitute of horns- passing on to those which have horns so small as to be almost rudimentary (as with the Antilocapra americana, in which species they are present in only one out of four or five females*)- to those which have fairly developed horns, but manifestly smaller and thinner than in the male and sometimes of a different shape,*(2)- ending with those in which both sexes have horns of equal size. As with the reindeer, so with antelopes, there exists, as previously shewn, a relation between the period of the development of the horns and their transmission to one or both sexes; it is therefore probable that their presence or absence in the females of some species, and their more or less perfect condition in the females of other species, depends, not on their being of any special use, but simply on inheritance. It accords with this view that even in the same restricted genus both sexes of some species, and the males alone of others, are thus provided. It is also a remarkable fact that, although the females of Antilope bezoartica are normally destitute of horns, Mr. Blyth has seen no less than three females thus furnished; and there was no reason to suppose that they were old or diseased.

* I am indebted to Dr. Canfield for this information; see also his paper in the Proceedings of the Zoological Society, 1866, p. 105.

*(2) For instance the horns of the female Ant. euchore resemble those of a distinct species, viz. the Ant. dorcas var. corine, see Desmarest, Mammalogie, p. 455.

In all the wild species of goats and sheep the horns are larger in the male than in the female, and are sometimes quite absent in the latter.* In several domestic breeds of these two animals, the males alone are furnished with horns; and in some breeds, for instance, in the sheep of North Wales, though both sexes are properly horned, the ewes are very liable to be hornless. I have been informed by a trustworthy witness, who purposely inspected a flock of these same sheep during the lambing season, that the horns at birth are generally more fully developed in the male than in the female. Mr. J. Peel crossed his Lonk sheep, both sexes of which always bear horns, with hornless Leicesters and hornless Shropshire Downs; and the result was that the male offspring had their horns considerably reduced, whilst the females were wholly destitute of them. These several facts indicate that, with sheep, the horns are a much less firmly fixed character in the females than in the males; and this leads us to look at the horns as properly of masculine origin.

* Gray, Catalogue of Mammalia, the British Museum, part iii., 1852, p. 160.

With the adult musk-ox (Ovibos moschatus) the horns of the male are larger than those of the female, and in the latter the bases do not touch.* In regard to ordinary cattle Mr. Blyth remarks: "In most of the wild bovine animals the horns are both longer and thicker in the bull than in the cow, and in the cow-banteng (Bos sondaicus) the horns are remarkably small, and inclined much backwards. In the domestic races of cattle, both of the humped and humpless types, the horns are short and thick in the bull, longer and more slender in the cow and ox; and in the Indian buffalo, they are shorter and thicker in the bull, longer and more slender in the cow. In the wild gaour (B. gaurus) the horns are mostly both longer and thicker in

the bull than in the cow."*(2) Dr. Forsyth Major also informs me that a fossil skull, believed to be that of the female Bos estruscus, has been found in Val d'Arno, which is wholly without horns. In the Rhinoceros simus, as I may add, the horns of the female are generally longer but less powerful than in the male; and in some other species of rhinoceros they are said to be shorter in the female.*(3) From these various facts we may infer as probable that horns of all kinds, even when they are equally developed in the two sexes, were primarily acquired by the male in order to conquer other males, and have been transferred more or less completely to the female.

* Richardson, Fauna Bor. Americana, p. 278.
*(2) Land and Water, 1867, p. 346.
*(3) Sir Andrew Smith, Zoology of S. Africa, pl. xix. Owen, Anatomy of Vertebrates, vol. iii., p. 624.

The effects of castration deserve notice, as throwing light on this same point. Stags after the operation never renew their horns. The male reindeer, however, must be excepted, as after castration he does renew them. This fact, as well as the possession of horns by both sexes, seems at first to prove that the horns in this species do not constitute a sexual character;* but as they are developed at a very early age, before the sexes differ in constitution, it is not surprising that they should be unaffected by castration, even if they were aboriginally acquired by the male. With sheep both sexes properly bear horns; and I am informed that with Welch sheep the horns of the males are considerably reduced by castration; but the degree depends much on the age at which the operation is performed, as is likewise the case with other animals. Merino rams have large horns, whilst the ewes "generally speaking are without horns"; and in this breed castration seems to produce a somewhat greater effect, so that if performed at an early age the horns "remain almost undeveloped."*(2)

* This is the conclusion of Seidlitz, Die Darwin'sche Theorie, 1871, p. 47.
*(2) I am much obliged to Prof. Victor Carus, for having made enquiries for me in Saxony on this subject. H. von Nathusius (Viehzucht, 1872, p. 64) says that the horns of sheep castrated at an early period, either altogether disappear or remain as mere rudiments; but I do not know whether he refers to merinos or to ordinary breeds.

On the Guinea coast there is a breed in which the females never bear horns, and, as Mr. Winwood Reade informs me, the rams after castration are quite destitute of them. With cattle, the horns of the males are much altered by castration; for instead of being short and thick, they become longer than those of the cow, but otherwise resemble them. The Antilope bezoartica offers a somewhat analogous case: the males have long straight spiral horns, nearly parallel to each other, and directed backwards; the females occasionally bear horns, but these when present are of a very different shape, for they are not spiral, and spreading widely, bend round with the points forwards. Now it is a remarkable fact that, in the castrated male, as Mr. Blyth informs me, the horns are of the same peculiar shape as in the female, but longer and thicker. If we may judge from analogy, the female probably shews us, in these two cases of cattle and the antelope, the former condition of the horns in some early progenitor of each species. But why castration should lead to the reappearance of an early condition of the horns cannot be explained with any certainty. Nevertheless, it seems probable, that in nearly the same manner as the constitutional disturbance in the offspring, caused by a cross between two distinct species or races, often leads to the reappearance of long-lost characters;* so here, the disturbance in the constitution of

the individual, resulting from castration, produces the same effect.

* I have given various experiments and other evidence proving that this is the case, in my Variation of Animals and Plants under Domestication, vol. ii., 1868, pp. 39-47.

The tusks of the elephant, in the different species or races, differ according to sex, nearly as do the horns of ruminants. In India and Malacca the males alone are provided with well-developed tusks. The elephant of Ceylon is considered by most naturalists as a distinct race, but by some as a distinct species, and here "not one in a hundred is found with tusks, the few that possess them being exclusively males."* The African elephant is undoubtedly distinct, and the female has large well-developed tusks, though not so large as those of the male.

* Sir J. Emerson Tennent, Ceylon, 1859, vol. ii., p. 274. For Malacca, Journal of Indian Archipelago, vol. iv., p. 357.

These differences in the tusks of the several races and species of elephants- the great variability of the horns of deer, as notably in the wild reindeer- the occasional presence of horns in the female Antilope bezoartica, and their frequent absence in the female of Antilocapra americana- the presence of two tusks in some few male narwhals- the complete absence of tusks in some female walruses- are all instances of the extreme variability of secondary sexual characters, and of their liability to differ in closely-allied forms.

Although tusks and horns appear in all cases to have been primarily developed as sexual weapons, they often serve other purposes. The elephant uses his tusks in attacking the tiger; according to Bruce, he scores the trunks of trees until they can be thrown down easily, and he likewise thus extracts the farinaceous cores of palms; in Africa he often uses one tusk, always the same, to probe the ground and thus ascertain whether it will bear his weight. The common bull defends the herd with his horns; and the elk in Sweden has been known, according to Lloyd, to strike a wolf dead with a single blow of his great horns. Many similar facts could be given. One of the most curious secondary uses to which the horns of an animal may be occasionally put is that observed by Captain Hutton* with the wild goat (Capra aegagrus) of the Himalayas and, as it is also said with the ibex, namely that when the male accidentally falls from a height he bends inwards his head, and by alighting on his massive horns, breaks the shock. The female cannot thus use her horns, which are smaller, but from her more quiet disposition she does not need this strange kind of shield so much.

* Calcutta Journal of Natural History, vol. ii, 1843, p. 526.

Each male animal uses his weapons in his own peculiar fashion. The common ram makes a charge and butts with such force with the bases of his horns, that I have seen a powerful man knocked over like a child. Goats and certain species of sheep, for instance the Ovis cycloceros of Afghanistan,* rear on their hind legs, and then not only butt, but "make a cut down and a jerk up, with the ribbed front of their scimitar-shaped horn, as with a sabre. When the O. cycloceros attacked a large domestic ram, who was a noted bruiser, he conquered him by the sheer novelty of his mode of fighting, always closing at once with his adversary, and catching him across the face and nose with a sharp drawing jerk of the head, and then bounding out of the way before the blow could be returned." In Pembrokeshire a male goat, the master of a flock which during several generations had run wild, was known to have killed several males in single combat; this goat possessed enormous horns, measuring thirty-nine inches in a straight line from tip to tip. The common bull, as every one knows, gores and tosses his opponent; but the Italian buffalo is said never

to use his horns: he gives a tremendous blow with his convex forehead, and then tramples on his fallen enemy with his knees- an instinct which the common bull does not possess.*(2) Hence a dog who pins a buffalo by the nose is immediately crushed. We must, however, remember that the Italian buffalo has been long domesticated, and it is by no means certain that the wild parent-form had similar horns. Mr. Bartlett informs me that when a female Cape buffalo (Bubalus caffer) was turned into an enclosure with a bull of the same species, she attacked him, and he in return pushed her about with great violence. But it was manifest to Mr. Bartlett that, had not the bull shewn dignified forbearance, he could easily have killed her by a single lateral thrust with his immense horns. The giraffe uses his short, hair-covered horns, which are rather longer in the male than in the female, in a curious manner; for, with his long neck he swings his head to either side, almost upside down, with such force that I have seen a hard plank deeply indented by a single blow.

* Mr. Blyth, in Land and Water, March, 1867, p. 134, on the authority of Capt. Hutton and others. For the wild Pembrokeshire goats, see the Field, 1869, p. 150.

*(2) M. E. M. Bailly, "Sur l'Usage des cornes," &c., Annal des Sciences Nat., tom. ii., 1824, p. 369.

With antelopes it is sometimes difficult to imagine how they can possibly use their curiously-shaped horns; thus the springboc (Ant. euchore) has rather short upright horns, with the sharp points bent inwards almost at right angles, so as to face each other; Mr. Bartlett does not know how they are used, but suggests that they would inflict a fearful wound down each side of the face of an antagonist. The slightly-curved horns of the Oryx leucoryx (see fig. 63) are directed backwards, and are of such length that their points reach beyond the middle of the back, over which they extend in almost parallel lines. Thus they seem singularly ill-fitted for fighting; but Mr. Bartlett informs me that when two of these animals prepare for battle, they kneel down, with their beads between their forelegs, and in this attitude the horns stand nearly parallel and close to the ground, with the points directed forwards and a little upwards. The combatants then gradually approach each other, and each endeavours to get the upturned points under the body of the other; if one succeeds in doing this, he suddenly springs up, throwing up his head at the same time, and can thus wound or perhaps even transfix his antagonist. Both animals always kneel down, so as to guard as far as possible against this manoeuvre. It has been recorded that one of these antelopes has used his horn with effect even against a lion; yet from being forced to place his head between the fore legs in order to bring the points of the horns forward, he would generally be under a great disadvantage when attacked by any other animal. It is, therefore, not probable that the horns have been modified into their present great length and peculiar position, as a protection against beasts of prey. We can however see that, as soon as some ancient male progenitor of the Oryx acquired moderately long horns, directed a little backwards, he would be compelled, in his battles with rival males, to bend his head somewhat inwards or downwards, as is now done by certain stags; and it is not improbable that he might have acquired the habit of at first occasionally and afterwards of regularly kneeling down. In this case it is almost certain that the males which possessed the longest horns would have had a great advantage over others with shorter horns; and then the horns would gradually have been rendered longer and longer, through sexual selection, until they acquired their present extraordinary length and position.

With stags of many kinds the branches of the horns offer a curious case of difficulty; for certainly a single straight point would inflict a much more serious wound than several diverging ones. In Sir Philip Egerton's museum there is a horn of the red-deer (Cervus

elaphus), thirty inches in length, with "not fewer than fifteen snags or branches"; and at Moritzburg there is still preserved a pair of antlers of a red-deer, shot in 1699 by Frederick I, one of which bears the astonishing number of thirty-three branches and the other twenty-seven, making altogether sixty branches. Richardson figures a pair of antlers of the wild reindeer with twenty-nine points.* From the manner in which the horns are branched, and more especially from deer being known occasionally to fight together by kicking with their fore feet,*(2) M. Bailly actually comes to the conclusion that their horns are more injurious than useful to them. But this author overlooks the pitched battles between rival males. As I felt much perplexed about the use or advantage of the branches, I applied to Mr. McNeill of Colonsay, who has long and carefully observed the habits of red-deer, and he informs me that he has never seen some of the branches brought into use, but that the brow antlers, from inclining downwards, are a great protection to the forehead, and their points are likewise used in attack. Sir Philip Egerton also informs me both as to red-deer and fallow-deer that, in fighting, they suddenly dash together, and getting their horns fixed against each other's bodies, a desperate struggle ensues. When one is at last forced to yield and turn round, the victor endeavours to plunge his brow antlers into his defeated foe. It thus appears that the upper branches are used chiefly or exclusively for pushing and fencing. Nevertheless in some species the upper branches are used as weapons of offence; when a man was attacked by a wapiti deer (Cervus canadensis) in Judge Caton's park in Ottawa, and several men tried to rescue him, the stag "never raised his head from the ground; in fact he kept his face almost flat on the ground, with his nose nearly between his fore feet, except when he rolled his head to one side to take a new observation preparatory to a plunge." In this position the ends of the horns were directed against his adversaries. "In rolling his head he necessarily raised it somewhat, because his antlers were so long that he could not roll his head without raising them on one side, while, on the other side they touched the ground." The stag by this procedure gradually drove the party of rescuers backwards to a distance of 150 or 200 feet; and the attacked man was killed.*(3)

* On the horns of red-deer, Owen, British Fossil Mammals, 1846, p. 478; Richardson on the horns of the reindeer, Fauna Bor. Americana, 1829, p. 240. I am indebted to Prof. Victor Carus, for the Moritzburg case.

*(2) Hon. J. D Caton (Ottawa Acad. of Nat. Science, May, 1868, p. 9) says that the American deer fight with their fore feet, after "the question of superiority has been once settled and acknowledged in the herd." Bailly, "Sur l'Usage des cornes," Annales des Sciences Nat., tom. ii., 1824, p. 371.

*(3) See a most interesting account in the Appendix to Hon. J. D. Caton's paper, as above quoted.

Although the horns of stags are efficient weapons, there can, I think, be no doubt that a single point would have been much more dangerous than a branched antler; and Judge Caton, who has had large experience with deer, fully concurs in this conclusion. Nor do the branching horns, though highly important as a means of defence against rival stags, appear perfectly well adapted for this purpose, as they are liable to become interlocked. The suspicion has therefore crossed my mind that they may serve in part as ornaments. That the branched antlers of stags as well as the elegant lyrated horns of certain antelopes, with their graceful double curvature (see fig. 64), are ornamental in our eyes, no one will dispute. If, then, the horns, like the splendid accoutrements of the knights of old, add to the noble appearance of stags and antelopes, they may have been modified partly for this purpose, though mainly for actual service in battle; but I have no evidence in favour of this belief.

An interesting case has lately been published, from which it appears that the horns of a deer in one district in the United States are now being modified through sexual and natural selection. A writer in an excellent American journal* says that he has hunted for the last twenty-one years in the Adirondacks, where the Cervus virginianus abounds. About fourteen years ago he first heard of spike-horn bucks. These became from year to year more common; about five years ago he shot one, and afterwards another, and now they are frequently killed. "The spike-horn differs greatly from the common antler of the C. virginianus. It consists of a single spike, more slender than the antler, and scarcely half so long, projecting forward from the brow, and terminating in a very sharp point. It gives a considerable advantage to its possessor over the common buck. Besides enabling him to run more swiftly through the thick woods and underbrush (every hunter knows that does and yearling bucks run much more rapidly than the large bucks when armed with their cumbrous antlers), the spike-horn is a more effective weapon than the common antler. With this advantage the spike-horn bucks are gaining upon the common bucks, and may, in time, entirely supersede them in the Adirondacks. Undoubtedly, the first spike-horn buck was merely an accidental freak of nature. But his spike-horns gave him an advantage, and enabled him to propagate his peculiarity. His descendants having a like advantage, have propagated the peculiarity in a constantly increasing ratio, till they are slowly crowding the antlered deer from the region they inhabit." A critic has well objected to this account by asking, why, if the simple horns are now so advantageous, were the branched antlers of the parent-form ever developed? To this I can only answer by remarking, that a new mode of attack with new weapons might be a great advantage, as shewn by the case of the Ovis cycloceros, who thus conquered a domestic ram famous for his fighting power. Though the branched antlers of a stag are well adapted for fighting with his rivals, and though it might be an advantage to the prong-horned variety slowly to acquire long and branched horns, if he had to fight only with others of the same kind, yet it by no means follows that branched horns would be the best fitted for conquering a foe differently armed. In the foregoing case of the Oryx leucoryx, it is almost certain that the victory would rest with an antelope having short horns, and who therefore did not need to kneel down, though an Oryx might profit by having still longer horns, if he fought only with his proper rivals.

* The American Naturalist, Dec., 1869, p. 552.

Male quadrupeds, which are furnished with tusks, use them in various ways, as in the case of horns. The boar strikes laterally and upwards; the musk-deer downwards with serious effect.* The walrus, though having so short a neck and so unwieldy a body, "can strike either upwards, or downwards, or sideways, with equal dexterity."*(2) I was informed by the late Dr. Falconer, that the Indian elephant fights in a different manner according to the position and curvature of his tusks. When they are directed forwards and upwards he is able to fling a tiger to a great distance- it is said to even thirty feet; when they are short and turned downwards he endeavours suddenly to pin the tiger to the ground and, in consequence, is dangerous to the rider, who is liable to be jerked off the howdah.*(3)

* Pallas Spicilegia Zoologica, fasc. xiii., 1779, p. 18.

*(2) Lamont, Seasons with the Sea-Horses, 1861, p. 141.

*(3) See also Corse (Philosophical Transactions, 1799, p. 212) on the manner in which the short-tusked Mooknah variety attacks other elephants.

Very few male quadrupeds possess weapons of two distinct kinds specially adapted for fighting with rival males. The male muntjac-deer (Cervulus), however, offers an exception, as he is provided with horns

and exserted canine teeth. But we may infer from what follows that one form of weapon has often been replaced in the course of ages by another. With ruminants the development of horns generally stands in an inverse relation with that of even moderately developed canine teeth. Thus camels, guanacoes, chevrotains, and musk-deer, are hornless, and they have efficient canines; these teeth being "always of smaller size in the females than in the males." The Camelidae have, in addition to their true canines, a pair of canine-shaped incisors in their upper jaws.* Male deer and antelopes, on the other hand, possess horns, and they rarely have canine teeth; and these, when present, are always of small size, so that it is doubtful whether they are of any service in their battles. In Antilope montana they exist only as rudiments in the young male, disappearing as he grows old; and they are absent in the female at all ages; but the females of certain other antelopes and of certain deer have been known occasionally to exhibit rudiments of these teeth.*(2) Stallions have small canine teeth, which are either quite absent or rudimentary in the mare; but they do not appear to be used in fighting, for stallions bite with their incisors, and do not open their mouths wide like camels and guanacoes. Whenever the adult male possesses canines, now inefficient, whilst the female has either none or mere rudiments, we may conclude that the early male progenitor of the species was provided with efficient canines, which have been partially transferred to the females. The reduction of these teeth in the males seems to have followed from some change in their manner of fighting, often (but not in the horse) caused by the development of new weapons.

* Owen, Anatomy of Vertebrates, vol. iii., p. 349.

*(2) See Ruppell (in Proc. Zoolog. Soc., Jan. 12, 1836, p. 3) on the canines in deer and antelopes, with a note, by Mr. Martin on a female American deer. See also Falconer (Palaeont. Memoirs and Notes, vol. i., 1868, p. 576) on canines in an adult female deer. In old males of the musk-deer the canines (Pallas, Spic. Zoolog., fasc. xiii., 1779, p. 18) sometimes grow to the length of three inches, whilst in old females a rudiment projects scarcely half an inch above the gums.

Tusks and horns are manifestly of high importance to their possessors, for their development consumes much organised matter. A single tusk of the Asiatic elephant- one of the extinct woolly species- and of the African elephant, have been known to weigh respectively 150, 160, and 180 pounds; and even greater weights have been given by some authors.* With deer, in which the horns are periodically renewed, the drain on the constitution must be greater; the horns, for instance, of the moose weigh from fifty to sixty pounds, and those of the extinct Irish elk from sixty to seventy pounds- the skull of the latter weighing on an average only five pounds and a quarter. Although the horns are not periodically renewed in sheep, yet their development, in the opinion of many agriculturists, entails a sensible loss to the breeder. Stags, moreover, in escaping from beasts of prey are loaded with an additional weight for the race, and are greatly retarded in passing through a woody country. The moose, for instance, with horns extending five and a half feet from tip to tip, although so skilful in their use that he will not touch or break a twig when walking quietly, cannot act so dexterously whilst rushing away from a pack of wolves. "During his progress he holds his nose up, so as to lay the horns horizontally back; and in this attitude cannot see the ground distinctly."*(2) The tips of the horns of the great Irish elk were actually eight feet apart! Whilst the horns are covered with velvet, which lasts with red-deer for about twelve weeks, they are extremely sensitive to a blow; so that in Germany the stags at this time somewhat change their habits, and avoiding dense forests, frequent young woods and low thickets.*(3) These facts remind us that male birds have acquired ornamental plumes at the cost of retarded

flight, and other ornaments at the cost of some loss of power in their battles with rival males.

* Emerson Tennent, Ceylon, 1859, vol. ii., p. 275; Owen, British Fossil Mammals, 1846, p. 245.

*(2) Richardson, Fauna Bor. Americana, on the moose, Alces palmata, pp. 236, 237; on the expanse of the horns, Land and Water, 1869, p. 143. See also Owen, British Fossil Mammals, on the Irish elk, pp. 447, 455.

*(3) Forest Creatures, by C. Boner, 1861, p. 60.

With mammals, when, as is often the case, the sexes differ in size, the males are almost always larger and stronger. I am informed by Mr. Gould that this holds good in a marked manner with the marsupials of Australia, the males of which appear to continue growing until an unusually late age. But the most extraordinary case is that of one of the seals (Callorhinus ursinus), a full-grown female weighing less than one-sixth of a full-grown male.* Dr. Gill remarks that it is with the polygamous seals, the males of which are well known to fight savagely together, that the sexes differ much in size; the monogamous species differing but little. Whales also afford evidence of the relation existing between the pugnacity of the males and their large size compared with that of the female; the males of the right-whales do not fight together, and they are not larger, but rather smaller, than their females; on the other hand, male sperm-whales fight much together, and their bodies are "often found scarred with the imprint of their rival's teeth," and they are double the size of the females. The greater strength of the male, as Hunter long ago remarked,*(2) is invariably displayed in those parts of the body which are brought into action in fighting with rival males- for instance, in the massive neck of the bull. Male quadrupeds are also more courageous and pugnacious than the females. There can be little doubt that these characters have been gained, partly through sexual selection, owing to a long series of victories, by the stronger and more courageous males over the weaker, and partly through the inherited effects of use. It is probable that the successive variations in strength, size, and courage, whether due to mere variability or to the effects of use, by the accumulation of which male quadrupeds have acquired these characteristic qualities, occurred rather late in life, and were consequently to a large extent limited in their transmission to the same sex.

* See the very interesting paper by Mr. J. A. Allen in Bull. Mus. Comp. Zoology of Cambridge, United States, vol. ii., No. 1, p. 82. The weights were ascertained by a careful observer, Capt. Bryant. Dr. Gill in The American Naturalist, January, 1871, Prof. Shaler on the relative size of the sexes of whales, American Naturalist, January, 1873.

*(2) Animal Economy, p. 45.

From these considerations I was anxious to obtain information as to the Scotch deer-hound, the sexes of which differ more in size than those of any other breed (though blood-hounds differ considerably), or than in any wild canine species known to me. Accordingly, I applied to Mr. Cupples, well known for his success with this breed, who has with great kindness collected for me the following facts from various sources. Fine male dogs, measured at the shoulder, range from 28 inches, which is low, to 33 or even 34 inches in height; and in weight from 80 pounds, which is light, to 120 pounds, or even more. The females range in height from 23 to 27, or even to 28 inches; and in weight from 50 to 70, or even 80 pounds.* Mr. Cupples concludes that from 95 to 100 pounds for the male, and 70 for the female, would be a safe average; but there is reason to believe that formerly both sexes attained a greater weight. Mr.

Cupples has weighed puppies when a fortnight old; in one litter the average weight of four males exceeded that of two females by six and a half ounces; in another litter the average weight of four males exceeded that of one female by less than one ounce; the same males when three weeks old, exceeded the female by seven and a half ounces, and at the age of six weeks by nearly fourteen ounces. Mr. Wright of Yeldersley House, in a letter to Mr. Cupples, says: "I have taken notes on the sizes and weights of puppies of many litters, and as far as my experience goes, dog-puppies as a rule differ very little from bitches till they arrive at about five or six months old; and then the dogs begin to increase, gaining upon the bitches both in weight and size. At birth, and for several weeks afterwards, a bitch-puppy will occasionally be larger than any of the dogs, but they are invariably beaten by them later." Mr. McNeill, of Colonsay, concludes that "the males do not attain their full growth till over two years old, though the females attain it sooner." According to Mr. Cupples' experience, male dogs go on growing in stature till they are from twelve to eighteen months old, and in weight till from eighteen to twenty-four months old; whilst the females cease increasing in stature at the age of from nine to fourteen or fifteen months, and in weight at the age of from twelve to fifteen months. From these various statements it is clear that the full difference in size between the male and female Scotch deer-hound is not acquired until rather late in life. The males almost exclusively are used for coursing, for, as Mr. McNeill informs me, the females have not sufficient strength and weight to pull down a full-grown deer. From the names used in old legends, it appears, as I hear from Mr. Cupples, that, at a very ancient period, the males were the most celebrated, the females being mentioned only as the mothers of famous dogs. Hence, during many generations, it is the male which has been chiefly tested for strength, size, speed, and courage, and the best will have been bred from. As, however, the males do not attain their full dimensions until rather late in life, they will have tended, in accordance with the law often indicated, to transmit their characters to their male offspring alone; and thus the great inequality in size between the sexes of the Scotch deer-hound may probably be accounted for.

* See also Richardson's Manual on the Dog, p. 59. Much valuable information on the Scottish deer-hound is given by Mr. McNeill, who first called attention to the inequality in size between the sexes, in Scrope's Art of Deer-Stalking. I hope that Mr. Cupples will keep to his intention of publishing a full account and history of this famous breed.

The males of some few quadrupeds possess organs or parts developed solely as a means of defence against the attacks of other males. Some kinds of deer use, as we have seen, the upper branches of their horns chiefly or exclusively for defending themselves; and the Oryx antelope, as I am informed by Mr. Bartlett, fences most skilfully with his long, gently curved horns; but these are likewise used as organs of offence. The same observer remarks that rhinoceroses in fighting, parry each other's sidelong blows with their horns, which clatter loudly together, as do the tusks of boars. Although wild boars fight desperately, they seldom, according to Brehm, receive fatal wounds, as the blows fall on each other's tusks, or on the layer of gristly skin covering the shoulder, called by the German hunters, the shield; and here we have a part specially modified for defence. With boars in the prime of life (see fig. 65) the tusks in the lower jaw are used for fighting, but they become in old age, as Brehm states, so much curved inwards and upwards over the snout that they can no longer be used in this way. They may, however, still serve, and even more effectively, as a means of defence. In compensation for the loss of the lower tusks as weapons of offence, those in the upper jaw, which always project a little laterally, increase in old age so much in

length and curve so much upwards that they can be used for attack. Nevertheless, an old boar is not so dangerous to man as one at the age of six or seven years.*

* Brehm, Thierleben, B. ii., ss. 729-32.

In the full-grown male Babirusa pig of Celebes (see fig. 66), the lower tusks are formidable weapons, like those of the European boar in the prime of life, whilst the upper tusks are so long and have their points so much curled inwards, sometimes even touching the forehead, that they are utterly useless as weapons of attack. They more nearly resemble horns than teeth, and are so manifestly useless as teeth that the animal was formerly supposed to rest his head by hooking them on to a branch! Their convex surfaces, however, if the head were held a little laterally, would serve as an excellent guard; and hence, perhaps, it is that in old animals they "are generally broken off, as if by fighting."* Here, then, we have the curious case of the upper tusks of the Babirusa regularly assuming during the prime of life a structure which apparently renders them fitted only for defence; whilst in the European boar the lower tusks assume in a less degree and only during old age nearly the same form, and then serve in like manner solely for defence.

* See Mr. Wallace's interesting account of this animal, The Malay Archipelago, 1869, vol. i., p. 435.

In the wart-hog (see Phacochoerus aethiopicus, fig. 67) the tusks in the upper jaw of the male curve upwards during the prime of life, and from being pointed serve as formidable weapons. The tusks in the lower jaw are sharper than those in the upper, but from their shortness it seems hardly possible that they can be used as weapons of attack. They must, however, greatly strengthen those in the upper jaw, from being ground so as to fit closely against their bases. Neither the upper nor the lower tusks appear to have been specially modified to act as guards, though no doubt they are to a certain extent used for this purpose. But the wart-hog is not destitute of other special means of protection, for it has, on each side of the face, beneath the eyes, a rather stiff, yet flexible, cartilaginous, oblong pad (see fig. 67), which projects two or three inches outwards; and it appeared to Mr. Bartlett and myself, when viewing the living animal, that these pads, when struck from beneath by the tusks of an opponent, would be turned upwards, and would thus admirably protect the somewhat prominent eyes. I may add, on the authority of Mr. Bartlett, that these boars when fighting stand directly face to face.

Lastly, the African river-hog (Potomochoerus penicillatus) has a hard cartilaginous knob on each side of the face beneath the eyes, which answers to the flexible pad of the wart-hog; it has also two bony prominences on the upper jaw above the nostrils. A boar of this species in the Zoological Gardens recently broke into the cage of the wart-hog. They fought all night long, and were found in the morning much exhausted, but not seriously wounded. It is a significant fact, as shewing the purposes of the above-described projections and excrescences, that these were covered with blood, and were scored and abraded in an extraordinary manner.

Although the males of so many members of the pig family are provided with weapons, and as we have just seen with means of defence, these weapons seem to have been acquired within a rather late geological period. Dr. Forsyth Major specifies* several miocene species, in none of which do the tusks appear to have been largely developed in the males; and Professor Rutimeyer was formerly struck with this same fact.

* Atti della Soc. Italiana di Sc. Nat., 1873, vol. xv. fasc. iv.

The mane of the lion forms a good defence against the attacks of

rival lions, the one danger to which he is liable; for the males, as Sir A. Smith informs me, engage in terrible battles, and a young lion dares not approach an old one. In 1857 a tiger at Bromwich broke into the cage of a lion and a fearful scene ensued: "the lion's mane saved his neck and head from being much injured, but the tiger at last succeeded in ripping up his belly, and in a few minutes he was dead."* The broad ruff round the throat and chin of the Canadian lynx (Felis canadensis) is much longer in the male than in the female; but whether it serves as a defence I do not know. Male seals are well known to fight desperately together, and the males of certain kinds (Otaria jubata)*(2) have great manes, whilst the females have small ones or none. The male baboon of the Cape of Good Hope (Cynocephalus porcarius) has a much longer mane and larger canine teeth than the female; and the mane probably serves as a protection, for, on asking the keepers in the Zoological Gardens, without giving them any clue to my object, whether any of the monkeys especially attacked each other by the nape of the neck, I was answered that this was not the case, except with the above baboon. In the Hamadryas baboon, Ehrenberg compares the mane of the adult male to that of a young lion, whilst in the young of both sexes and in the female the mane is almost absent.

* The Times, Nov. 10, 1857. In regard to the Canada lynx, see Audubon and Bachman, Quadrupeds of North America, 1846, p. 139.

*(2) Dr. Murie, on Otaria, Proc. Zoolog. Soc., 1869, p. 109. Mr. J. A. Allen, in the paper above quoted (p. 75), doubts whether the hair, which is longer on the neck in the male than in the female, deserves to be called a mane.

It appeared to me probable that the immense woolly mane of the male American bison, which reaches almost to the ground, and is much more developed in the males than in the females, served as a protection to them in their terrible battles; but an experienced hunter told Judge Caton that he had never observed anything which favoured this belief. The stallion has a thicker and fuller mane than the mare; and I have made particular inquiries of two great trainers and breeders, who have had charge of many entire horses, and am assured that they "invariably endeavour to seize one another by the neck." It does not, however, follow from the foregoing statements, that when the hair on the neck serves as a defence, that it was originally developed for this purpose, though this is probable in some cases, as in that of the lion. I am informed by Mr. McNeill that the long hairs on the throat of the stag (Cervus elaphus) serve as a great protection to him when hunted, for the dogs generally endeavour to seize him by the throat; but it is not probable that these hairs were specially developed for this purpose; otherwise the young and the females would have been equally protected.

Choice in Pairing by either Sex of Quadrupeds.- Before describing in the next chapter, the differences between the sexes in voice, odours emitted, and ornaments, it will be convenient here to consider whether the sexes exert any choice in their unions. Does the female prefer any particular male, either before or after the males may have fought together for supremacy; or does the male, when not a polygamist, select any particular female? The general impression amongst breeders seems to be that the male accepts any female; and this owing to his eagerness, is, in most cases, probably the truth. Whether the female as a general rule indifferently accepts any male is much more doubtful. In the fourteenth chapter, on birds, a considerable body of direct and indirect evidence was advanced, shewing that the female selects her partner; and it would be a strange anomaly if female quadrupeds, which stand higher in the scale and have higher mental powers, did not generally, or at least often, exert some choice. The female could in most cases escape, if wooed by a male that did not please or excite her; and when pursued by several males, as

commonly occurs, she would often have the opportunity, whilst they were fighting together, of escaping with some one male, or at least of temporarily pairing with him. This latter contingency has often been observed in Scotland with female red-deer, as I am informed by Sir Philip Egerton and others.*

* Mr. Boner, in his excellent description of the habits of the red-deer in Germany (Forest Creatures, 1861, p. 81) says, "while the stag is defending his rights against one intruder, another invades the sanctuary of his harem, and carries off trophy after trophy." Exactly the same thing occurs with seals; see Mr. J. A. Allen, ibid., p. 100.

It is scarcely possible that much should be known about female quadrupeds in a state of nature making any choice in their marriage unions. The following curious details on the courtship of one of the eared seals (Callorhinus ursinus) are given* on the authority of Capt. Bryant, who had ample opportunities for observation. He says, "Many of the females on their arrival at the island where they breed appear desirous of returning to some particular male, and frequently climb the outlying rocks to overlook the rookeries, calling out and listening as if for a familiar voice. Then changing to another place they do the same again.... As soon as a female reaches the shore, the nearest male goes down to meet her, making meanwhile a noise like the clucking of a hen to her chickens. He bows to her and coaxes her until he gets between her and the water so that she cannot escape him. Then his manner changes, and with a harsh growl he drives her to a place in his harem. This continues until the lower row of harems is nearly full. Then the males higher up select the time when their more fortunate neighbours are off their guard to steal their wives. This they do by taking them in their mouths and lifting them over the heads of the other females, and carefully placing them in their own harem, carrying them as cats do their kittens. Those still higher up pursue the same method until the whole space is occupied. Frequently a struggle ensues between two males for the possession of the same female, and both seizing her at once pull her in two or terribly lacerate her with their teeth. When the space is all filled, the old male walks around complacently reviewing his family, scolding those who crowd or disturb the others, and fiercely driving off all intruders. This surveillance always keeps him actively occupied."

* Mr. J. A. Allen in Bull. Mus. Comp. Zoolog. of Cambridge, United States, vol. ii., No. 1, p. 99.

As so little is known about the courtship of animals in a state of nature, I have endeavoured to discover how far our domesticated quadrupeds evince any choice in their unions. Dogs offer the best opportunity for observation, as they are carefully attended to and well understood. Many breeders have expressed a strong opinion on this head. Thus, Mr. Mayhew remarks, "The females are able to bestow their affections; and tender recollections are as potent over them as they are known to be in other cases, where higher animals are concerned. Bitches are not always prudent in their loves, but are apt to fling themselves away on curs of low degree. If reared with a companion of vulgar appearance, there often springs up between the pair a devotion which no time can afterwards subdue. The passion, for such it really is, becomes of a more than romantic endurance." Mr. Mayhew, who attended chiefly to the smaller breeds, is convinced that the females are strongly attracted by males of a large size.* The well-known veterinary Blaine states*(2) that his own female pug dog became so attached to a spaniel, and a female setter to a cur, that in neither case would they pair with a dog of their own breed until several weeks had elapsed. Two similar and trustworthy accounts have been given me in regard to a female retriever and a spaniel, both of

which became enamoured with terrier-dogs.

* Dogs: their Management, by E. Mayhew, M. R. C. V. S., 2nd ed., 1864, pp. 187-192.
*(2) Quoted by Alex. Walker, On Intermarriage, 1838, p. 276; see also p. 244.

Mr. Cupples informs me that he can personally vouch for the accuracy of the following more remarkable case, in which a valuable and wonderfully-intelligent female terrier loved a retriever belonging to a neighbour to such a degree, that she had often to be dragged away from him. After their permanent separation, although repeatedly showing milk in her teats, she would never acknowledge the courtship of any other dog, and to the regret of her owner never bore puppies. Mr. Cupples also states, that in 1868, a female deerhound in his kennel thrice produced puppies, and on each occasion shewed a marked preference for one of the largest and handsomest, but not the most eager, of four deerhounds living with her, all in the prime of life. Mr. Cupples has observed that the female generally favours a dog whom she has associated with and knows; her shyness and timidity at first incline her against a strange dog. The male, on the contrary, seems rather inclined towards strange females. It appears to be rare when the male refuses any particular female, but Mr. Wright, of Yeldersley House, a great breeder of dogs, informs me that he has known some instances; he cites the case of one of his own deerhounds, who would not take any notice of a particular female mastiff, so that another deerhound had to be employed. It would be superfluous to give, as I could, other instances, and I will only add that Mr. Barr, who has carefully bred many bloodhounds, states that in almost every instance particular individuals of opposite sexes shew a decided preference for each other. Finally, Mr. Cupples, after attending to this subject for another year, has written to me, "I have had full confirmation of my former statement, that dogs in breeding form decided preferences for each other, being often influenced by size, bright colour, and individual characters, as well as by the degree of their previous familiarity."

In regard to horses, Mr. Blenkiron, the greatest breeder of race-horses in the world, informs me that stallions are so frequently capricious in their choice, rejecting one mare and without any apparent cause taking to another, that various artifices have to be habitually used. The famous Monarque, for instance, would never consciously look at the dam of Gladiateur, and a trick had to be practised. We can partly see the reason why valuable race-horse stallions, which are in such demand as to be exhausted, should be so particular in their choice. Mr. Blenkiron has never known a mare to reject a horse; but this has occured in Mr. Wright's stable, so that the mare had to be cheated. Prosper Lucas* quotes various statements from French authorities, and remarks, "On voit des etalons qui s'eprennent d'une jument, et negligent toutes les autres." He gives, on the authority of Baelen, similar facts in regard to bulls; and Mr. H. Reeks assures me that a famous short-horn bull belonging to his father "invariably refused to be matched with a black cow." Hoffberg, in describing the domesticated reindeer of Lapland says, "Foeminae majores et fortiores mares prae, caeteris admittunt, ad eos confugiunt, a junioribus agitatae, qui hos in fugam conjiciunt."*(2) A clergyman, who has bred many pigs, asserts that sows often reject one boar and immediately accept another.

* Traite de l'Hered. Nat., tom. ii., 1850, p. 296.
*(2) Amaenitates Acad., vol. iv., 1788, p. 160.

From these facts there can be no doubt that, with most of our domesticated quadrupeds, strong individual antipathies and preferences are frequently exhibited, and much more commonly by the female than by the male. This being the case, it is improbable that the unions of

quadrupeds in a state of nature should be left to mere chance. It is much more probable that the females are allured or excited by particular males, who possess certain characters in a higher degree than other males; but what these characters are, we can seldom or never discover with certainty.