CHAPTER XVIII.

SECONDARY SEXUAL CHARACTERS OF MAMMALS- Continued.

QUADRUPEDS use their voices for various purposes, as a signal of danger, as a call from one member of a troop to another, or from the mother to her lost offspring, or from the latter for protection to their mother; but such uses need not here be considered. We are concerned only with the difference between the voices of the sexes, for instance between that of the lion and lioness, or of the bull and cow. Almost all male animals use their voices much more during the rutting-season than at any other time; and some, as the giraffe and porcupine,* are said to be completely mute excepting at this season. As the throats (i.e. the larynx and thyroid bodies*(2)) of stags periodically become enlarged at the beginning of the breeding-season, it might be thought that their powerful voices must be somehow of high importance to them; but this is very doubtful. From information given to me by two experienced observers, Mr. McNeill and Sir P. Egerton, it seems that young stags under three years old do not roar or bellow; and that the old ones begin bellowing at the commencement of the breeding-season, at first only occasionally and moderately, whilst they restlessly wander about in search of the females. Their battles are prefaced by loud and prolonged bellowing, but during the actual conflict they are silent. Animals of all kinds which habitually use their voices utter various noises under any strong emotion, as when enraged and preparing to fight; but this may merely be the result of nervous excitement, which leads to the spasmodic contraction of almost all the muscles of the body, as when a man grinds his teeth and clenches his fists in rage or agony. No doubt stags challenge each other to mortal combat by bellowing; but those with the more powerful voices, unless at the same time the stronger, better-armed, and more courageous, would not gain any advantage over their rivals.

* Owen, Anatomy of Vertebrates, vol. iii., p. 585.
*(2) Ibid., p. 595.

It is possible that the roaring of the lion may be of some service to him by striking terror into his adversary; for when enraged he likewise erects his mane and thus instinctively tries to make himself appear as terrible as possible. But it can hardly be supposed that the bellowing of the stag, even if it be of service to him in this way, can have been important enough to have led to the periodical enlargement of the throat. Some writers suggest that the bellowing serves as a call to the female; but the experienced observers above quoted inform me that female deer do not search for the male, though the males search eagerly for the females, as indeed might be expected from what we know of the habits of other male quadrupeds. The voice of the female, on the other hand, quickly brings to her one or more stags,* as is well known to the hunters who in wild countries imitate her cry. If we could believe that the male had the power to excite or allure the female by his voice, the periodical enlargement of his vocal organs would be intelligible on the principle of sexual selection, together with inheritance limited to the same sex and season; but we have no evidence in favour of this view. As the case stands, the loud voice of the stag during the breeding-season does not seem to be of any special service to him, either during his courtship or battles, or in any other way. But may we not believe that the frequent use of the voice, under the strong excitement of love, jealousy, and rage, continued during many generations, may at last have produced an inherited effect on the vocal organs of the stag, as well as of other male animals;, This appears to me, in our present state of knowledge, the most probable view.

* See, for instance, Major W. Ross King (The Sportsman in Canada, 1866, pp. 53, 131) on the habits of the moose and wild reindeer.

The voice of the adult male gorilla is tremendous, and he is furnished with a laryngeal sack, as is the adult male orang.* The gibbons rank among the noisiest of monkeys, and the Sumatra species (Hylobates syndactylus) is also furnished with an air sack; but Mr. Blyth, who has had opportunities for observation, does not believe that the male is noisier than the female. Hence, these latter monkeys probably use their voices as a mutual call; and this is certainly the case with some quadrupeds, for instance the beaver.*(2) Another gibbon, the H. agilis, is remarkable, from having the power of giving a complete and correct octave of musical notes,*(3) which we may reasonably suspect serves as a sexual charm; but I shall have to recur to this subject in the next chapter. The vocal organs of the American Mycetes caraya are one-third larger in the male than in the female, and are wonderfully powerful. These monkeys in warm weather make the forests resound at morning and evening with their overwhelming voices. The males begin the dreadful concert, and often continue it during many hours, the females sometimes joining in with their less powerful voices. An excellent observer, Rengger,*(4) could not perceive that they were excited to begin by any special cause; he thinks that, like many birds, they delight in their own music, and try to excel each other. Whether most of the foregoing monkeys have acquired their powerful voices in order to beat their rivals and charm the females- or whether the vocal organs have been strengthened and enlarged through the inherited effects of long-continued use without any particular good being thus gained- I will not pretend to say; but the former view, at least in the case of the Hylobates agilis, seems the most probable.

* Owen Anatomy of Vertebrates, vol. iii., p. 600.

*(2) Mr. Green, in Journal of Linnean Society, vol. x., Zoology, 1869, note 362.

*(3) C. L. Martin, General Introduction to the Natural History of Mamm. Animals, 1841, p. 431.

*(4) Naturgeschichte der Saugethiere von Paraguay, 1830, ss. 15, 21.

I may here mention two very curious sexual peculiarities occurring in seals, because they have been supposed by some writers to affect the voice. The nose of the male sea-elephant (Macrorhinus proboscideus) becomes greatly elongated during the breeding-season, and can then be erected. In this state it is sometimes a foot in length. The female is not thus provided at any period of life. The male makes a wild, hoarse, gurgling noise, which is audible at a great distance and is believed to be strengthened by the proboscis; the voice of the female being different. Lesson compares the erection of the proboscis, with the swelling of the wattles of male gallinaceous birds whilst courting the females. In another allied kind of seal, the bladder-nose (Cystophora cristata), the head is covered by a great hood or bladder. This supported by the septum of the nose, which is produced far backwards and rises into an internal crest seven inches in height. The hood is clothed with short hair, and is muscular; can be inflated until it more than equals the whole head in size! The males when rutting, fight furiously on the ice, and their roaring "is said to be sometimes so loud as to be heard four miles off." When attacked they likewise roar or bellow; and whenever irritated the bladder is inflated and quivers. Some naturalists believe that the voice is thus strengthened, but various other uses have been assigned to this extraordinary structure. Mr. R. Brown thinks that it serves as a protection against accidents of all kinds; but this is not probable, for, as I am assured by Mr. Lamont who killed 600 of these animals, the hood is rudimentary in the females, and it is not developed in the males during youth.*

* On the sea-elephant, see an article by Lesson, in Dict. Class. Hist. Nat., tom. xiii., p. 418. For the Cystophora, or Stemmatopus, see Dr. Dekay, Annals of Lyceum of Nat. Hist., New York, vol. i., 1824, p. 94. Pennant has also collected information from the sealers on this animal. The fullest account is given by Mr. Brown, in Proc. Zoolog. Soc., 1868, p. 435.

Odour.- With some animals, as with the notorious skunk of America, the overwhelming odour which they emit appears to serve exclusively as a defence. With shrew-mice (Sorex) both sexes possess abdominal scent-glands and there can be little doubt, from the rejection of their bodies by birds and beasts of prey, that the odour is protective; nevertheless, the glands become enlarged in the males during the breeding-season. In many other quadrupeds the glands are of the same size in both sexes,* but their uses are not known. In other species the glands are confined to the males, or are more developed than in the females; and they almost always become more active during the rutting-season. At this period the glands on the sides of the face of the male elephant enlarge, and emit a secretion having a strong musky odour. The males, and rarely the females, of many kinds of bats have glands and protrudable sacks situated in various parts; and it is believed that these are odoriferous.

* As with the castoreum of the beaver, see Mr. L. H. Morgan's most interesting work, The American Beaver, 1868, p. 300. Pallas (Spic. Zoolog., fasc. viii., 1779, p. 23) has well discussed the odoriferous glands of mammals. Owen (Anat. of Vertebrates, vol. iii., p. 634) also gives an account of these glands, including those of the elephant, and (p. 763) those of shrew-mice. On bats, Mr. Dobson, Proceedings of the Zoological Society. 1873, p. 241.

The rank effluvium of the male goat is well known, and that of certain male deer is wonderfully strong and persistent. On the banks of the Plata I perceived the air tainted with the odour of the male Cervus campestris, at half a mile to leeward of a herd; and a silk handkerchief, in which I carried home a skin, though often used and washed, retained, when first unfolded, traces of the odour for one year and seven months. This animal does not emit its strong odour until more than a year old, and if castrated whilst young never emits it.* Besides the general odour, permeating the whole body of certain ruminants (for instance Bos moschatus) in the breeding-season, many deer, antelopes, sheep, and goats possess odoriferous glands in various situations, more especially on their faces. The so-called tear-sacks, or suborbital pits, come under this head. These glands secrete a semi-fluid fetid matter which is sometimes so copious as to stain the whole face, as I have myself seen in an antelope. They are "usually larger in the male than in the female, and their development is checked by castration."*(2) According to Desmarest they are altogether absent in the female of Antilope subgutturosa. Hence, there can be no doubt that they stand in close relation with the reproductive functions. They are also sometimes present, and sometimes absent, in nearly allied forms. In the adult male musk-deer (Moschus moschiferus), a naked space round the tail is bedewed with an odoriferous fluid, whilst in the adult female, and in the male until two years old, this space is covered with hair and is not odoriferous. The proper musk-sack of this deer is from its position necessarily confined to the male, and forms an additional scent-organ. It is a singular fact that the matter secreted by this latter gland, does not, according to Pallas, change in consistence, or increase in quantity, during the rutting-season; nevertheless this naturalist admits that its presence is in some way connected with the act of reproduction. He gives, however, only a conjectural and unsatisfactory explanation of its use.*(3)

* Rengger, Naturgeschichte der Saugethiere von Paraguay, 1830, s.

355. This observer also gives some curious particulars in regard to the odour.

*(2) Owen, Anatomy of Vertebrates, vol. iii., p. 632. See also Dr. Murie's observations on those glands in the Proc. Zoolog. Soc., 1870, p. 340. Desmarest, "On the Antilope subgutturosa," Mammalogie, 1820, p. 455.

*(3) Pallas, Spicilegia Zoolog., fasc. xiii., 1779, p. 24; Desmoulins, Dict. Class. d'Hist. Nat., tom. iii., p. 586.

In most cases, when only the male emits a strong odour during the breeding-season, it probably serves to excite or allure the female. We must not judge on this head by our own taste, for it is well known that rats are enticed by certain essential oils, and cats by valerian, substances far from agreeable to us; and that dogs, though they will not eat carrion, sniff and roll on it. From the reasons given when discussing the voice of the stag, we may reject the idea that the odour serves to bring the females from a distance to the males. Active and long-continued use cannot here have come into play, as in the case of the vocal organs. The odour emitted must be of considerable importance to the male, inasmuch as large and complex glands, furnished with muscles for everting the sack, and for closing or opening the orifice, have in some cases been developed. The development of these organs is intelligible through sexual selection, if the most odoriferous males are the most successful in winning the females, and in leaving offspring to inherit their gradually perfected glands and odours.

Development of the Hair.- We have seen that male quadrupeds often have the hair on their necks and shoulders much more developed than the females; and many additional instances could be given. This sometimes serves as a defence to the male during his battles; but whether the hair in most cases has been specially developed for this purpose, is very doubtful. We may feel almost certain that this is not the case, when only a thin and narrow crest runs along the back; for a crest of this kind would afford scarcely any protection, and the ridge of the back is not a place likely to be injured; nevertheless such crests are sometimes confined to the males, or are much more developed in them than in the females. Two antelopes, the Tragelaphus scriptus* (see fig. 70) and Portax picta may be given as instances. When stags, and the males of the wild goat, are enraged or terrified, these crests stand erect;*(2) but it cannot be supposed that they have been developed merely for the sake of exciting fear in their enemies. One of the above-named antelopes, the Portax picta, has a large well-defined brush of black hair on the throat, and this is much larger in the male than in the female. In the Ammotragus tragelaphus of north Africa, a member of the sheep-family, the fore-legs are almost concealed by an extraordinary growth of hair, which depends from the neck and upper halves of the legs; but Mr. Bartlett does not believe that this mantle is of the least use to the male, in whom it is much more developed than in the female.

* Dr. Gray, Gleanings from the Menagerie at Knowsley, pl. 28.

*(2) Judge Caton on the wapiti, Transact. Ottawa Acad. Nat. Sciences, 1868, pp. 36, 40; Blyth, Land and Water, on Capra aegagrus 1867, p. 37.

Male quadrupeds of many kinds differ from the females in having more hair, or hair of a different character, on certain parts of their faces. Thus the bull alone has curled hair on the forehead.* In three closely-allied sub-genera of the goat family, only the males possess beards sometimes of large size; in two other sub-genera both sexes have a beard, but it disappears in some of the domestic breeds of the common goat; and neither sex of the Hemitragus has a beard. In the ibex the beard is not developed during the summer, and it is so small at other times

that it may be called rudimentary.*(2) With some monkeys the beard is confined to the male, as in the orang; or is much larger in the male than in the female, as in the Mycetes caraya and Pithecia satanas (see fig. 68). So it is with the whiskers of some species of Macacus,*(3) and, as we have seen, with the manes of some species of baboons. But with most kinds of monkeys the various tufts of hair about the face and head are alike in both sexes.

* Hunter's Essays and Observations, edited by Owen, 1861. vol. i., p. 236.

*(2) See Dr. Gray's Catalogue of Mammalia in the British Museum, part iii., 1852, p. 144.

*(3) Rengger, Saugthiere, &c., s. 14; Desmarest, Mammalogie, p. 86.

The males of various members of the ox family (Bovidae), and of certain antelopes, are furnished with a dewlap, or great fold of skin on the neck, which is much less developed in the female.

Now, what must we conclude with respect to such sexual differences as these? No one will pretend that the beards of certain male goats, or the dewlaps of the bull, or the crests of hair along the backs of certain male antelopes, are of any use to them in their ordinary habits. It is possible that the immense beard of the male Pithecia, and the large beard of the male orang, may protect their throats when fighting; for the keepers in the Zoological Gardens inform me that many monkeys attack each other by the throat; but it is not probable that the beard has been developed for a distinct purpose from that served by the whiskers, moustache, and other tufts of hair on the face; and no one will suppose that these are useful as a protection. Must we attribute all these appendages of hair or skin to mere purposeless variability in the male? It cannot be denied that this is possible; for in many domesticated quadrupeds, certain characters, apparently not derived through reversion from any wild parent form, are confined to the males, or are more developed in them than in the females- for instance, the hump on the male zebu-cattle of India, the tail of fat-tailed rams, the arched outline of the forehead in the males of several breeds of sheep, and lastly, the mane, the long hairs on the hind legs, and the dewlap of the male of the Berbura goat.* The mane, which occurs only in the rams of an African breed of sheep, is a true secondary sexual character, for, as I hear from Mr. Winwood Reade, it is not developed if the animal be castrated. Although we ought to be extremely cautious, as shewn in my work on Variation under Domestication, in concluding that any character, even with animals kept by semi-civilised people, has not been subjected to selection by man, and thus augmented, yet in the cases just specified this is improbable; more especially as the characters are confined to the males, or are more strongly developed in them than in the females. If it were positively known that the above African ram is a descendant of the same primitive stock as the other breeds of sheep, and if the Berbura male-goat with his mane, dewlap, &c., is descended from the same stock as other goats, then, assuming that selection has not been applied to these characters, they must be due to simple variability, together with sexually-limited inheritance.

* See the chapters on these several animals in vol. i. of my Variation of Animals under Domestication; also vol. ii., p. 73; also chap. xx. on the practice of selection by semi-civilised people. For the Berbuar goat, see Dr. Gray, Catalogue, ibid., p. 157.

Hence it appears reasonable to extend this same view to all analogous cases with animals in a state of nature. Nevertheless I cannot persuade myself that it generally holds good, as in the case of the extraordinary development of hair on the throat and fore-legs of the male Ammotragus, or in that of the immense beard of the male Pithecia. Such study as I have been able to give to nature makes me

believe that parts or organs which are highly developed, were acquired at some period for a special purpose. With those antelopes in which the adult male is more strongly-coloured than the female, and with those monkeys in which the hair on the face is elegantly arranged and coloured in a diversified manner, it seems probable that the crests and tufts of hair were gained as ornaments; and this I know is the opinion of some naturalists. If this be correct, there can be little doubt that they were gained or at least modified through sexual selection; but how far the same view may be extended to other mammals is doubtful.

Colour of the Hair and of the Naked Skin.- I will first give briefly all the cases known to me of male quadrupeds differing in colour from the females. With marsupials, as I am informed by Mr. Gould, the sexes rarely differ in this respect; but the great red kangaroo offers a striking exception, "delicate blue being the prevailing tint in those parts of the female which in the male are red."* In the Didelphis opossum of Cayenne the female is said to be a little more red than the male. Of the rodents, Dr. Gray remarks: "African squirrels, especially those found in the tropical regions, have the fur much brighter and more vivid at some seasons of the year than at others, and the fur of the male is generally brighter than that of the female."*(2) Dr. Gray informs me that he specified the African squirrels, because, from their unusually bright colours, they best exhibit this difference. The female of the Mus minutus of Russia is of a paler and dirtier tint than the male. In a large number of bats the fur of the male is lighter than in the female.*(3) Mr. Dobson also remarks, with respect to these animals: "Differences, depending partly or entirely on the possession by the male of fur of a much more brilliant hue, or distinguished by different markings or by the greater length of certain portions, are met only, to any appreciable extent, in the frugivorous bats in which the sense of sight is well developed." This last remark deserves attention, as bearing on the question whether bright colours are serviceable to male animals from being ornamental. In one genus of sloths, it is now established, as Dr. Gray states, "that the males are ornamented differently from the females- that is to say, that they have a patch of soft short hair between the shoulders, which is generally of a more or less orange colour, and in one species pure white. The females, on the contrary, are destitute of this mark."

* Osphranter rufus, Gould, Mammals of Australia, 1863, vol. ii. On the Didelphis, Desmarest, Mammalogie, p. 256.

*(2) Annals and Magazine of Natural History, Nov., 1867, p. 325. On the Mus minutus, Desmarest, Mammalogie, p. 304.

*(3) J. A. Allen, in Bulletin of Mus. Comp. Zoolog. of Cambridge, United States, 1869, p. 207. Mr. Dobson on sexual characters in the Chiroptera, Proceedings of the Zoological Society, 1873, p. 241. Dr. Gray on sloths, ibid., 1871, p. 436.

The terrestrial Carnivora and Insectivora rarely exhibit sexual differences of any kind, including colour. The ocelot (Felis pardalis), however, is exceptional, for the colours of the female, compared with those of the male, are "moins apparentes, le fauve, etant plus terne, le blanc moins pur, les raies ayant moins de largeur et les taches moins de diametre."* The sexes of the allied Felis mitis also differ, but in a less degree; the general hues of the female being rather paler than in the male, with the spots less black. The marine Carnivora or seals, on the other hand, sometimes differ considerably in colour, and they present, as we have already seen, other remarkable sexual differences. Thus the male of the Otaria nigrescens of the southern hemisphere is of a rich brown shade above; whilst the female, who acquires her adult tints earlier in life than the male, is dark-grey above, the young of both sexes being of a deep chocolate colour. The male of the northern Phoca groenlandica

is tawny grey, with a curious saddle-shaped dark mark on the back; the female is much smaller, and has a very different appearance, being "dull white or yellowish straw-colour, with a tawny hue on the back"; the young at first are pure white, and can "hardly be distinguished among the icy hummocks and snow, their colour thus acting as a protection."*(2)

* Desmarest Mammalogie, 1820, p. 220. On Felis mitis, Rengger, ibid., s. 194.
*(2) Dr. Murie on the Otaria, Proceedings Zoological Society, 1869, p. 108. Mr. R. Brown on the P. groenlandica, ibid., 1868, p. 417. See also on the colours of seals, Desmarest, ibid., pp. 243, 249.

With ruminants sexual differences of colour occur more commonly than in any other order. A difference of this kind is general in the strepsicerene antelopes; thus the male nilghau (Portax picta) is bluish-grey and much darker than the female, with the square white patch on the throat, the white marks on the fetlocks, and the black spots on the ears all much more distinct. We have seen that in this species the crests and tufts of hair are likewise more developed in the male than in the hornless female. I am informed by Mr. Blyth that the male, without shedding his hair, periodically becomes darker during the breeding-season. Young males cannot be distinguished from young females until about twelve months old; and if the male is emasculated before this period, he never, according to the same authority, changes colour. The importance of this latter fact, as evidence that the colouring of the Portax is of sexual origin, becomes obvious, when we hear* that neither the red summer coat nor the blue winter-coat of the Virginian deer is at all affected by emasculation. With most or all of the highly-ornamented species of Tragelaphus the males are darker than the hornless females, and their crests of hair are more fully developed. In the male of that magnificent antelope, the Derbyan eland, the body is redder, the whole neck much blacker, and the white band which separates these colours broader than in the female. In the Cape eland, also, the male is slightly darker than the female.*(2)

* Judge Caton, in Transactions of the Ottawa Academy of Natural Sciences, 1868, p. 4.
*(2) Dr. Gray, Cat. of Mamm. in Brit. Mus., part iii., 1852, pp. 134-142; also Dr. Gray, Gleanings from the Menagerie of Knowsley, in which there is a splendid drawing of the Oreas derbianus: see the text on Tragelaphus. For the Cape eland (Oreas canna), see Andrew Smith, Zoology of S. Africa, pls. 41 and 42. There are also many of these antelopes in the Zoological Gardens.

In the Indian black-buck (A. bezoartica), which belongs to another tribe of antelopes, the male is very dark, almost black; whilst the hornless female is fawn-coloured. We meet in this species, as Mr. Blyth informs me, with an exactly similar series of facts, as in the Portax picta, namely, in the male periodically changing colour during the breeding-season, in the effects of emasculation on this change, and in the young of both sexes being indistinguishable from each other. In the Antilope niger the male is black, the female, as well as the young of both sexes, being brown; in A. sing-sing the male is much brighter coloured than the hornless female, and his chest and belly are blacker; in the male A. caama, the marks and lines which occur on various parts of the body are black, instead of brown as in the female; in the brindled gnu (A. gorgon) "the colours of the male are nearly the same as those of the female, only deeper and of a brighter hue."* Other analogous cases could be added.

* On the Ant. niger, see Proc. Zool. Soc., 1850, p. 133. With respect to an allied species, in which there is an equal sexual difference in colour, see Sir S. Baker, The Albert Nyanza, 1866,

vol. ii., p. 627. For the A. sing-sing, Gray, Cat. B. Mus., p. 100. Desmarest, Mammalogie, p. 468, on the A. caama. Andrew Smith, Zoology of S. Africa, on the gnu.

The banteng bull (Bos sondaicus) of the Malayan Archipelago is almost black, with white legs and buttocks; the cow is of a bright dun, as are the young males until about the age of three years, when they rapidly change colour. The emasculated bull reverts to the colour of the female. The female kemas goat is paler, and both it and the female Capra aegagrus are said to be more uniformly tinted than their males. Deer rarely present any sexual differences in colour. Judge Caton, however, informs me that in the males of the wapiti deer (Cervus canadensis) the neck, belly, and legs are much darker than in the female; but during the winter the darker tints gradually fade away and disappear. I may here mention that Judge Caton has in his park three races of the Virginian deer, which differs slightly in colour, but the differences are almost exclusively confined to the blue winter or breeding-coat; so that this case may be compared with those given in a previous chapter of closely-allied or representative species of birds, which differ from each other only in their breeding plumage.* The females of Cervus paludosus of S. America, as well as the young of both sexes, do not possess the black stripes on the nose and the blackish-brown line on the breast, which are characteristic of the adult males.*(2) Lastly, as I am informed by Mr. Blyth, the mature male of the beautifully coloured and spotted axis deer is considerably darker than the female: and this hue the castrated male never acquires.

* Ottawa Academy of Sciences, May 21, 1868, pp. 3,5.

*(2) S. Muller, on the banteng, Zoog. Indischen Archipel., 1839-1844, tab. 35; see also Raffles, as quoted by Mr. Blyth, in Land and Water, 1867, p. 476. On goats, Dr. Gray, Catalogue, of the British Museum, p. 146; Desmarest, Mammalogie, p. 482. On the Cervus paludosus, Rengger, ibid., s. 345.

The last Order which we need consider is that of the primates. The male of the Lemur macaco is generally coal-black, whilst the female is brown.* Of the Quadrumana of the New World, the females and young of Mycetes caraya are greyish-yellow and like each other; in the second year the young male becomes reddish-brown; in the third, black, excepting the stomach, which, however, becomes quite black in the fourth or fifth year. There is also a strongly-marked difference in colour between the sexes of Mycetes seniculus and Cebus capucinus; the young of the former, and I believe of the latter species, resembling the females. With Pithecia leucocephala the young likewise resemble the females, which are brownish-black above and light rusty-red beneath, the adult males being black. The ruff of hair round the face of Ateles marginatus is tinted yellow in the male and white in the female. Turning to the Old World, the males of Hylobates hoolock are always black, with the exception of a white band over the brows; the females vary from whity-brown to a dark tint mixed with black, but are never wholly black.*(2) In the beautiful Cercopithecus diana, the head of the adult male is of an intense black, whilst that of the female is dark grey; in the former the fur between the thighs is of an elegant fawn colour, in the latter it is paler. In the beautiful and curious moustache monkey (Cercopithecus cephus) the only difference between the sexes is that the tail of the male is chestnut and that of the female grey; but Mr. Bartlett informs me that all the hues become more pronounced in the male when adult, whilst in the female they remain as they were during youth. According to the coloured figures given by Solomon Muller, the male of Semnopithecus chrysomelas is nearly black, the female being pale brown. In the Cercopithecus cynosurus and griseoviridis one part of the body, which is confined to the male sex, is of the most brilliant blue or green, and contrasts strikingly with the naked

skin on the hinder part of the body, which is vivid red.

* Sclater, Proc. Zool. Soc., 1866, p. i. The same fact has also been fully ascertained by M. M. Pollen and van Dam. See, also, Dr. Gray in Annals and Magazine of Natural History, May, 1871, p. 340.

*(2) On Mycetes, Rengger, ibid., s. 14; and Brehm, Illustriertes Thierleben, B. i., ss. 96, 107. On Ateles Desmarest, Mammalogie, p. 75. On Hylobates, Blyth, Land and Water, 1867, p. 135. On the Semnopithecus, S. Muller, Zoog. Indischen Archipel., tab. x.

Lastly, in the baboon family, the adult male of Cynocephalus hamadryas differs from the female not only by his immense mane, but slightly in the colour of the hair and of the naked callosities. In the drill (C. leucophaeus) the females and young are much paler-coloured, with less green, than the adult males. No other member in the whole class of mammals is coloured in so extraordinary a manner as the adult male mandrill (C. mormon). The face at this age becomes of a fine blue, with the ridge and tip of the nose of the most brilliant red. According to some authors, the face is also marked with whitish stripes, and is shaded in parts with black, but the colours appear to be variable. On the forehead there is a crest of hair, and on the chin a yellow beard. "Toutes les parties superieures de leurs cuisses et le grand espace nu de leurs fesses sont egalement colores du rouge le plus vif, avec un melange de bleu qui ne manque reellement pas d'elegance."* When the animal is excited all the naked parts become much more vividly tinted. Several authors have used the strongest expressions in describing these resplendent colours, which they compare with those of the most brilliant birds. Another remarkable peculiarity is that when the great canine teeth are fully developed, immense protuberances of bone are formed on each cheek, which are deeply furrowed longitudinally, and the naked skin over them is brilliantly-coloured, as just-described. (See fig. 69.) In the adult females and in the young of both sexes these protuberances are scarcely perceptible; and the naked parts are much less bright coloured, the face being almost black, tinged with blue. In the adult female, however, the nose at certain regular intervals of time becomes tinted with red.

* Gervais, Hist., Nat. des Mammiferes, 1854, p. 103. Figures are given of the skull of the male. Also Desmarest, Mammalogie, p. 70. Geoffroy St-Hilaire and F. Cuvier, Hist. Nat. des Mammiferes, 1824, tom. i.

In all the cases hitherto given the male is more strongly or brighter coloured than the female, and differs from the young of both sexes. But as with some few birds it is the female which is brighter coloured than the male, so with the rhesus monkey (Macacus rhesus), the female has a large surface of naked skin round the tail, of a brilliant carmine red, which, as I was assured by the keepers in the Zoological Gardens, periodically becomes even yet more vivid, and her face also is pale red. On the other hand, in the adult male and in the young of both sexes (as I saw in the Gardens), neither the naked skin at the posterior end of the body, nor the face, shew a trace of red. It appears, however, from some published accounts, that the male does occasionally, or during certain seasons, exhibit some traces of the red. Although he is thus less ornamented than the female, yet in the larger size of his body, larger canine teeth, more developed whiskers, more prominent superciliary ridges, he follows the common rule of the male excelling the female.

I have now given all the cases known to me of a difference in colour between the sexes of mammals. Some of these may be the result of variations confined to one sex and transmitted to the same sex, without any good being gained, and therefore without the aid of selection. We have instances of this with our domesticated animals, as in the males of certain cats being rusty-red, whilst the females are

tortoise-shell coloured. Amalogous cases occur in nature: Mr. Bartlett has seen many black varieties of the jaguar, leopard, vulpine phalanger, and wombat; and he is certain that all, or nearly all these animals, were males. On the other hand, with wolves, foxes, and apparently American squirrels, both sexes are occasionally born black. Hence it is quite possible that with some mammals a difference in colour between the sexes, especially when this is congenital, may simply be the result, without the aid of selection, of the occurrence of one or more variations, which from the first were sexually limited in their transmission. Nevertheless it is improbable that the diversified, vivid, and contrasted colours of certain quadrupeds, for instance, of the above monkeys and antelopes, can thus be accounted for. We should bear in mind that these colours do not appear in the male at birth, but only at or near maturity; and that unlike ordinary variations, they are lost if the male be emasculated. It is on the whole probable that the strongly-marked colours and other ornamental characters of male quadrupeds are beneficial to them in their rivalry with other males, and have consequently been acquired through sexual selection. This view is strengthened by the differences in colour between the sexes occurring almost exclusively, as may be collected from the previous details, in those groups and sub-groups of mammals which present other and strongly-marked secondary sexual characters; these being likewise due to sexual selection.

Quadrupeds manifestly take notice of colour. Sir S. Baker repeatedly observed that the African elephant and rhinoceros attacked white or grey horses with special fury. I have elsewhere shewn* that half-wild horses apparently prefer to pair with those of the same colour, and that herds of fallow-deer of different colours, though living together, have long kept distinct. It is a more significant fact that a female zebra would not admit the addresses of a male ass until he was painted so as to resemble a zebra, and then, as John Hunter remarks, "she received him very readily. In this curious fact, we have instinct excited by mere colour, which had so strong an effect as to get the better of everything else. But the male did not require this, the female being an animal somewhat similar to himself, was sufficient to rouse him."*(2)

* The Variation of Animals and Plants under Domestication, 1868, vol. ii., pp. 102, 103.

*(2) Essays and Observations, by J. Hunter, edited by Owen, 1861, i., p. 194.

In an earlier chapter we have seen that the mental powers of the higher animals do not differ in kind, though greatly in degree, from the corresponding powers of man, especially of the lower and barbarous races; and it would appear that even their taste for the beautiful is not widely different from that of the Quadrumana. As the negro of Africa raises the flesh on his face into parallel ridges "or cicatrices, high above the natural surface, which unsightly deformities are considered great personal attractions";*- as negroes and savages in many parts of the world paint their faces with red, blue, white, or black bars,- so the male mandrill of Africa appears to have acquired his deeply-furrowed and gaudily-coloured face from having been thus rendered attractive to the female. No doubt it is to us a most grotesque notion that the posterior end of the body should be coloured for the sake of ornament even more brilliantly than the face; but this is not more strange than that the tails of many birds should be especially decorated.

* Sir S. Baker, The Nile Tributaries of Abyssinia, 1867.

With mammals we do not at present possess any evidence that the males take pains to display their charms before the female; and the elaborate manner in which this is performed by male birds and other

animals is the strongest argument in favour of the belief that the females admire, or are excited by, the ornaments and colours displayed before them. There is, however, a striking parallelism between mammals and birds in all their secondary sexual characters, namely in their weapons for fighting with rival males, in their ornamental appendages, and in their colours. In both classes, when the male differs from the female, the young of both sexes almost always resemble each other, and in a large majority of cases resemble the adult female. In both classes the male assumes the characters proper to his sex shortly before the age of reproduction; and if emasculated at an early period, loses them. In both classes the change of colour is sometimes seasonal, and the tints of the naked parts sometimes become more vivid during the act of courtship. In both classes the male is almost always more vividly or strongly coloured than the female, and is ornamented with larger crests of hair or feathers, or other such appendages. In a few exceptional cases the female in both classes is more highly ornamented than the male. With many mammals, and at least in the case of one bird, the male is more odoriferous than the female. In both classes the voice of the male is more powerful than that of the female. Considering this parallelism, there can be little doubt that the same cause, whatever it may be, has acted on mammals and birds; and the result, as far as ornamental characters are concerned, may be attributed, as it appears to me, to the long-continued preference of the individuals of one sex for certain individuals of the opposite sex, combined with their success in leaving a larger number of offspring to inherit their superior attractions.

Equal transmission of ornamental characters to both sexes.- With many birds, ornaments, which analogy leads us to believe were primarily acquired by the males, have been transmitted equally, or almost equally, to both sexes; and we may now enquire how far this view applies to mammals. With a considerable number of species, especially of the smaller kinds, both sexes have been coloured, independently of sexual selection, for the sake of protection; but not, as far as I can judge, in so many cases, nor in so striking a manner, as in most of the lower classes. Audubon remarks that he often mistook the musk-rat,* whilst sitting on the banks of a muddy stream, for a clod of earth, so complete was the resemblance. The hare on her form is a familiar instance of concealment through colour; yet this principle partly fails in a closely-allied species, the rabbit, for when running to its burrow, it is made conspicuous to the sportsman, and no doubt to all beasts of prey, by its upturned white tail. No one doubts that the quadrupeds inhabiting snow-clad regions have been rendered white to protect them from their enemies, or to favour their stealing on their prey. In regions where snow never lies for long, a white coat would be injurious; consequently, species of this colour are extremely rare in the hotter parts of the world. It deserves notice that many quadrupeds inhabiting moderately cold regions, although they do not assume a white winter dress, become paler during this season; and this apparently is the direct result of the conditions to which they have long been exposed. Pallas*(2) states that in Siberia a change of this nature occurs with the wolf, two species of Mustela, the domestic horse, the Equus hemionus, the domestic cow, two species of antelopes, the musk-deer, the roe, elk, and reindeer. The roe, for instance, has a red summer and a greyish-white winter coat; and the latter may perhaps serve as a protection to the animal whilst wandering through the leafless thickets, sprinkled with snow and hoar-frost. If the above-named animals were gradually to extend their range into regions perpetually covered with snow, their pale winter-coats would probably be rendered through natural selection, whiter and whiter, until they became as white as snow.

* Fiber zibethicus, Audubon and Bachman, The Quadrupeds of North America, 1846, p. 109.

*(2) Novae species Quadrupedum e Glirium ordine, 1778, p. 7. What I have called the roe is the Capreolus sibricus subecaudatus of Pallas.

Mr. Reeks has given me a curious instance of an animal profiting by being peculiarly coloured. He raised from fifty to sixty white and brown piebald rabbits in a large walled orchard; and he had at the same time some similarly coloured cats in his house. Such cats, as I have often noticed, are very conspicuous during day; but as they used to lie in watch during the dusk at the mouths of the burrows, the rabbits apparently did not distinguish them from their parti-coloured brethren. The result was that, within eighteen months, every one of these parti-coloured rabbits was destroyed; and there was evidence that this was effected by the cats. Colour seems to be advantageous to another animal, the skunk, in a manner of which we have had many instances in other classes. No animal will voluntarily attack one of these creatures on account of the dreadful odour which it emits when irritated; but during the dusk it would not easily be recognized and might be attacked by a beast of prey. Hence it is, as Mr. Belt believes,* that the skunk is provided with a great white bushy tail, which serves as a conspicuous warning.

* The Naturalist in Nicaragua, p. 249.

Although we must admit that many quadrupeds have received their present tints either as a protection, or as an aid in procuring prey, yet with a host of species, the colours are far too conspicuous and too singularly arranged to allow us to suppose that they serve for these purposes. We may take as an illustration certain antelopes; when we see the square white patch on the throat, the white marks on the fetlocks, and the round black spots on the ears, all more distinct in the male of the Portax picta, than in the female;- when we see that the colours are more vivid, that the narrow white lines on the flank and the broad white bar on the shoulder are more distinct in the male Oreas derbyanus than in the female;- when we see a similar difference between the sexes of the curiously-ornamented Tragelaphus scriptus (see fig. 70),- we cannot believe that differences of this kind are of any service to either sex in their daily habits of life. It seems a much more probable conclusion that the various marks were first acquired by the males and their colours intensified through sexual selection, and then partially transferred to the females. If this view be admitted, there can be little doubt that the equally singular colours and marks of many other antelopes, though common to both sexes, have been gained and transmitted in a like manner. Both sexes, for instance, of the koodoo (Strepsiceros kudu) (see fig. 64) have narrow white vertical lines on their hind flanks, and an elegant angular white mark on their foreheads. Both sexes in the genus Damalis are very oddly coloured; in D. pygarga the back and neck are purplish-red, shading on the flanks into black; and these colours are abruptly separated from the white belly and from a large white space on the buttocks; the head is still more oddly coloured, a large oblong white mask, narrowly-edged with black, covers the face up to the eyes (see fig. 71); there are three white stripes on the forehead, and the ears are marked with white. The fawns of this species are of a uniform pale yellowish-brown. In Damalis albifrons the colouring of the head differs from that in the last species in a single white stripe replacing the three stripes, and in the ears being almost wholly white.* After having studied to the best of my ability the sexual differences of animals belonging to all classes, I cannot avoid the conclusion that the curiously-arranged colours of many antelopes, though common to both sexes, are the result of sexual selection primarily applied to the male.

* See the fine plates in A. Smith's Zoology of South Africa, and Dr.

Gray's Gleanings from the Menagerie of Knowsley.

The same conclusion may perhaps be extended to the tiger, one of the most beautiful animals in the world, the sexes of which cannot be distinguished by colour, even by the dealers in wild beasts. Mr. Wallace believes* that the striped coat of the tiger "so assimilates with the vertical stems of the bamboo, as to assist greatly in concealing him from his approaching prey." But this view does not appear to me satisfactory. We have some slight evidence that his beauty may be due to sexual selection, for in two species of Felis the analogous marks and colours are rather brighter in the male than in the female. The zebra is conspicuously striped, and stripes cannot afford any protection in the open plains of South Africa. Burchell*(2) in describing a herd says, "their sleek ribs glistened in the sun, and the brightness and regularity of their striped coats presented a picture of extraordinary beauty, in which probably they are not surpassed by any other quadruped." But as throughout the whole group of the Equidae the sexes are identical in colour, we have here no evidence of sexual selection. Nevertheless he who attributes the white and dark vertical stripes on the flanks of various antelopes to this process, will probably extend the same view to the royal tiger and beautiful zebra.

* Westminster Review, July 1, 1867, p. 5.
*(2) Travels in South Africa, 1824, vol. ii., p. 315.

We have seen in a former chapter that when young animals belonging to any class follow nearly the same habits of life as their parents, and yet are coloured in a different manner, it may be inferred that they have retained the colouring of some ancient and extinct progenitor. In the family of pigs, and in the tapirs, the young are marked with longitudinal stripes, and thus differ from all the existing adult species in these two groups. With many kinds of deer the young are marked with elegant white spots, of which their parents exhibit not a trace. A graduated series can be followed from the axis deer, both sexes of which at all ages and during all seasons are beautifully spotted (the male being rather more strongly coloured than the female), to species in which neither the old nor the young are spotted. I will specify some of the steps in this series. The Manchurian deer (Cervus mantchuricus) is spotted during the whole year, but, as I have seen in the Zoological Gardens, the spots are much plainer during the summer, when the general colour of the coat is lighter, than during the winter, when the general colour is darker and the horns are fully developed. In the hog-deer (Hyelaphus porcinus) the spots are extremely conspicuous during the summer when the coat is reddish-brown, but quite disappear during the winter when the coat is brown.* In both these species the young are spotted. In the Virginian deer the young are likewise spotted, and about five per cent of the adult animals living in Judge Caton's park, as I am informed by him, temporarily exhibit at the period when the red summer coat is being replaced by the bluish winter coat, a row of spots on each flank, which are always the same in number, though very variable in distinctness. From this condition there is but a very small step to the complete absence of spots in the adults at all seasons; and, lastly, to their absence at all ages and seasons, as occurs with certain species. From the existence of this perfect series, and more especially from the fawns of so many species being spotted, we may conclude that the now living members of the deer family are the descendants of some ancient species which, like the axis deer, was spotted at all ages and seasons. A still more ancient progenitor probably somewhat resembled the Hyomoschus aquaticus- for this animal is spotted, and the hornless males have large exserted canine teeth, of which some few true deer still retain rudiments. Hyomoschus, also, offers one of those interesting cases of a form linking together two groups, for it is intermediate in certain

osteological characters between the pachyderms and ruminants, which were formerly thought to be quite distinct.*(2)

* Dr. Gray, Gleanings from the Menagerie of Knowsley, p. 64. Mr. Blyth, in speaking (Land and Water, 1869, p. 42) of the hog-deer of Ceylon, says it is more brightly spotted with white than the common hog-deer, at the season when it renews its horns.

*(2) Falconer and Cautley, Proc. Geolog. Soc., 1843; and Falconer's Pal. Memoirs, vol. i., p. 196.

A curious difficulty here arises. If we admit that coloured spots and stripes were first acquired as ornaments, how comes it that so many existing deer, the descendants of an aboriginally spotted animal, and all the species of pigs and tapirs, the descendants of an aboriginally striped animal, have lost in their adult state their former ornaments? I cannot satisfactorily answer this question. We may feel almost sure that the spots and stripes disappeared at or near maturity in the progenitors of our existing species, so that they were still retained by the young; and owing to the law of inheritance at corresponding ages, were transmitted to the young of all succeeding generations. It may have been a great advantage to the lion and puma, from the open nature of their usual haunts, to have lost their stripes, and to have been thus rendered less conspicuous to their prey; and if the successive variations, by which this end was gained, occurred rather late in life, the young would have retained their stripes, as is now the case. As to deer, pigs, and tapirs, Fritz Muller has suggested to me that these animals, by the removal of their spots or stripes through natural selection, would have been less easily seen by their enemies; and that they would have especially required this protection, as soon as the Carnivora increased in size and number during the tertiary periods. This may be the true explanation, but it is rather strange that the young should not have been thus protected, and still more so that the adults of some species should have retained their spots, either partially or completely, during part of the year. We know that, when the domestic ass varies and becomes reddish-brown, grey, or black, the stripes on the shoulders and even on the spine frequently disappear, though we cannot explain the cause. Very few horses, except dun-coloured kinds, have stripes on any part of their bodies, yet we have good reason to believe that the aboriginal horse was striped on the legs and spine, and probably on the shoulders.* Hence the disappearance of the spots and stripes in our adult existing deer, pigs, and tapirs, may be due to a change in the general colour of their coats; but whether this change was effected through sexual or natural selection, or was due to the direct action of the conditions of life, or to some other unknown cause, it is impossible to decide. An observation made by Mr. Sclater well illustrates our ignorance of the laws which regulate the appearance and disappearance of stripes; the species of Asinus which inhabit the Asiatic continent are destitute of stripes, not having even the cross shoulder-stripe, whilst those which inhabit Africa are conspicuously striped, with the partial exception of A. taeniopus, which has only the cross shoulder-stripe and generally some faint bars on the legs; and this species inhabits the almost intermediate region of Upper Egypt and Abyssinia.*(2)

* The Variation of Animals and Plants under Domestication, 1868, vol. i., pp. 61-64.

*(2) Proc. Zool. Soc., 1862, p. 164. See, also, Dr. Hartmann, Ann. d. Landw., Dd. xliii., s. 222.

Quadrumana.- Before we conclude, it will be well to add a few remarks on the ornaments of monkeys. In most of the species the sexes resemble each other in colour, but in some, as we have seen, the males differ from the females, especially in the colour of the naked parts of the skin, in the development of the beard, whiskers, and

mane. Many species are coloured either in so extraordinary or so beautiful a manner, and are furnished with such curious and elegant crests of hair, that we can hardly avoid looking at these characters as having been gained for the sake of ornament. The accompanying figures (see figs. 72 to 76) serve to shew the arrangement of the hair on the face and head in several species. It is scarcely conceivable that these crests of hair, and the strongly contrasted colours of the fur and skin, can be the result of mere variability without the aid of selection; and it is inconceivable that they can be of use in any ordinary way to these animals. If so, they have probably been gained through sexual selection, though transmitted equally, or almost equally, to both sexes. With many of the Quadrumana, we have additional evidence of the action of sexual selection in the greater size and strength of the males, and in the greater development of their canine teeth, in comparison with the females.

A few instances will suffice of the strange manner in which both sexes of some species are coloured, and of the beauty of others. The face of the Cercopithecus petaurista (see fig. 77) is black, the whiskers and beard being white, with a defined, round, white spot on the nose, covered with short white hair, which gives to the animal an almost ludicrous aspect. The Semnopithecus frontatus likewise has a blackish face with a long black beard, and a large naked spot on the forehead of a bluish-white colour. The face of Macacus lasiotus is dirty flesh-coloured, with a defined red spot on each cheek. The appearance of Cercocebus aethiops is grotesque, with its black face, white whiskers and collar, chestnut head, and a large naked white spot over each eyelid. In very many species, the beard, whiskers, and crests of hair round the face are of a different colour from the rest of the head, and when different, are always of a lighter tint,* being often pure white, sometimes bright yellow, or reddish. The whole face of the South American Brachyurus calvus is of a "glowing scarlet hue"; but this colour does not appear until the animal is nearly mature.*(2) The naked skin of the face differs wonderfully in colour in the various species. It is often brown or flesh-colour, with parts perfectly white, and often as black as that of the most sooty negro. In the Brachyurus the scarlet tint is brighter than that of the most blushing Caucasian damsel. It is sometimes more distinctly orange than in any Mongolian, and in several species it is blue, passing into violet or grey. In all the species known to Mr. Bartlett, in which the adults of both sexes have strongly-coloured faces, the colours are dull or absent during early youth. This likewise holds good with the mandrill and Rhesus, in which the face and the posterior parts of the body are brilliantly coloured in one sex alone. In these latter cases we have reason to believe that the colours were acquired through sexual selection; and we are naturally led to extend the same view to the foregoing species, though both sexes when adult have their faces coloured in the same manner.

* I observed this fact in the Zoological Gardens; and many cases may be seen in the coloured plates in Geoffroy St-Hilaire and F. Cuvier, Histoire Nat. des Mammiferes, tom. i., 1824.

*(2) Bates, The Naturalist on the Amazons, 1863, vol. ii., p. 310.

Although many kinds of monkeys are far from beautiful according to our taste, other species are universally admired for their elegant appearance and bright colours. The Semnopithecus nemaeus, though peculiarly coloured, is described as extremely pretty; the orange-tinted face is surrounded by long whiskers of glossy whiteness, with a line of chestnut-red over the eyebrows; the fur on the back is of a delicate grey, with a square patch on the loins, the tail and the fore-arms being of a pure white; a gorget of chestnut surmounts the chest; the thighs are black, with the legs chestnut-red. I will mention only two other monkeys for their beauty; and I have selected these as presenting slight sexual differences in colour, which renders it in some degree probable that both sexes owe their

elegant appearance to sexual selection. In the moustache-monkey (Cercopithecus cephus) the general colour of the fur is mottled-greenish with the throat white; in the male the end of the tail is chestnut, but the face is the most ornamented part, the skin being chiefly bluish-grey, shading into a blackish tint beneath the eyes, with the upper lip of a delicate blue, clothed on the lower edge with a thin black moustache; the whiskers are orange-coloured, with the upper part black, forming a band which extends backwards to the ears, the latter being clothed with whitish hairs. In the Zoological Society's Gardens I have often overheard visitors admiring the beauty of another monkey, deservedly called Cercopithecus diana (see fig. 78); the general colour of the fur is grey; the chest and inner surface of the fore legs are white; a large triangular defined space on the hinder part of the back is rich chestnut; in the male the inner sides of the thighs and the abdomen are delicate fawn-coloured, and the top of the head is black; the face and ears are intensely black, contrasting finely with a white transverse crest over the eyebrows and a long white peaked beard, of which the basal portion is black.*

* I have seen most of the above monkeys in the Zoological Society's Gardens. The description of the Semnopithecus nemaeus is taken from Mr. W. C. Martin's Natural History of Mammalia, 1841, p. 460; see also pp. 475, 523.

In these and many other monkeys, the beauty and singular arrangement of their colours, and still more the diversified and elegant arrangement of the crests and tufts of hair on their heads, force the conviction on my mind that these characters have been acquired through sexual selection exclusively as ornaments.

Summary.- The law of battle for the possession of the female appears to prevail throughout the whole great class of mammals. Most naturalists will admit that the greater size, strength, courage, and pugnacity of the male, his special weapons of offence, as well as his special means of defence, have been acquired or modified through that form of selection which I have called sexual. This does not depend on any superiority in the general struggle for life, but on certain individuals of one sex, generally the male, being successful in conquering other males, and leaving a larger number of offspring to inherit their superiority than do the less successful males.

There is another and more peaceful kind of contest, in which the males endeavour to excite or allure the females by various charms. This is probably carried on in some cases by the powerful odours emitted by the males during the breeding-season; the odoriferous glands having been acquired through sexual selection. Whether the same view can be extended to the voice is doubtful, for the vocal organs of the males must have been strengthened by use during maturity, under the powerful excitements of love, jealousy or rage, and will consequently have been transmitted to the same sex. Various crests, tufts, and mantles of hair, which are either confined to the male, or are more developed in this sex than in the female, seem in most cases to be merely ornamental, though they sometimes serve as a defence against rival males. There is even reason to suspect that the branching horns of stags, and the elegant horns of certain antelopes, though properly serving as weapons of offence or defence, have been partly modified for ornament.

When the male differs in colour from the female, he generally exhibits darker and more strongly-contrasted tints. We do not in this class meet with the splendid red, blue, yellow, and green tints, so common with male birds and many other animals. The naked parts, however, of certain Quadrumana must be excepted; for such parts, often oddly situated, are brilliantly coloured in some species. The colours of the male in other cases may be due to simple variation, without the aid of selection. But when the colours are diversified and strongly pronounced, when they are not developed until near

maturity, and when they are lost after emasculation, we can hardly avoid the conclusion that they have been acquired through sexual selection for the sake of ornament, and have been transmitted exclusively, or almost exclusively, to the same sex. When both sexes are coloured in the same manner, and the colours are conspicuous or curiously arranged, without being of the least apparent use as a protection, and especially when they are associated with various other ornamental appendages, we are led by analogy to the same conclusion, namely, that they have been acquired through sexual selection, although transmitted to both sexes. That conspicuous and diversified colours, whether confined to the males or common to both sexes, are as a general rule associated in the same groups and sub-groups with other secondary sexual characters serving for war or for ornament, will be found to hold good, if we look back to the various cases given in this and the last chapter.

The law of the equal transmission of characters to both sexes, as far as colour and other ornaments are concerned, has prevailed far more extensively with mammals than with birds; but weapons, such as horns and tusks, have often been transmitted either exclusively or much more perfectly to the males than to the females. This is surprising, for, as the males generally use their weapons for defence against enemies of all kinds, their weapons would have been of service to the females. As far as we can see, their absence in this sex can be accounted for only by the form of inheritance which has prevailed. Finally, with quadrupeds the contest between the individuals of the same sex, whether peaceful or bloody, has, with the rarest exceptions, been confined to the males; so that the latter have been modified through sexual selection, far more commonly than the females, either for fighting with each other or for alluring the opposite sex.