

(c) *Individual Preference*.—Owing to our scant information concerning the courtship of animals in a state of nature, Darwin did not succeed in discovering any cases among mammals of decided preference shown by a male for any particular female; and regarding domesticated quadrupeds, "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." A few cases of special preference or antipathy in dogs, horses, bulls, and boars, were, however, communicated to him. Concerning birds Darwin remarks that "In all ordinary cases the

male is so eager that he will accept any female, and does not, as far as we can judge, prefer one to the other, but . . . exceptions to this rule apparently occur in some few groups. With domesticated birds, I have heard of only one case of males showing any preference for certain females, namely, that of the domestic cock, who, according to the high authority of Mr. Hewitt, prefers the younger to the older hens."

This, however, is at best only a polygamous sort of Preference, which, after all, lacks the essential traits of Individualisation and Exclusiveness. With the long-tailed duck (*Harelda glacialis*), M. Ekström says, "It has been remarked that certain females are much more courted than the rest. Frequently, indeed, one sees an individual surrounded by six or eight amorous males." Whether this statement is credible Darwin does not know; but the Swedish sportsmen, he adds, shoot these females and stuff them as decoys.

In female animals, on the other hand, the "overtone" of Individual Preference appears to be more frequently present. Darwin even asserts that "the exertion of some choice on the part of the female seems a law almost as general as the eagerness of the male;" but this is not borne out by the numerous illustrations given by himself, showing that when two or more males are engaged in jealous combat, "the female looks on as a passive spectator," and finally goes off with the victor, whichever of the rivals he may prove to be, without showing the slightest concern for the vanquished. An Australian forest-maiden might behave similarly under these

circumstances, but a civilised maiden would cling to the one who had made the deepest impression on her previous to the combat ; and if wounded, would adore him all the more ; for in her Love pity is a stronger ingredient than even the love of prowess.

That female birds, however, *sometimes* exert a choice is admitted even by Mr. A. R. Wallace (*Tropical Nature*, p. 199); and a few of the cases referred to by Darwin may here be cited : "Audubon—and we must remember that he spent a long life in prowling about the forests of the United States and observing the birds—does not doubt that the female deliberately chooses her mate ; thus, speaking of a woodpecker, he says the hen is followed by half a dozen gay suitors, who continue performing strange antics 'until a marked preference is shown for one.' The female of the red-winged starling (*Agelæus phœniceus*) is likewise pursued by several males, 'until, becoming fatigued, she alights, receives their addresses, and soon makes a choice.' He describes also how several male nightjars repeatedly plunge through the air with astonishing rapidity, suddenly turning, and thus making a singular noise ; 'but no sooner has the female made her choice than the other males are driven away.'"

Concerning domesticated birds we have seen that that gallinaceous sultan, the domestic cock, shows a decided preference for the younger hens in his harem. But the female is not a bit less frivolous and capricious ; for, according to Mr. Hewitt, she almost invariably prefers the most vigorous, defiant, and mettlesome male ; hence it is almost useless, he adds, "to attempt true breeding

if a game-cock in good health and condition runs the locality, for almost every hen on leaving the roosting-place will resort to the game-cock, even though that bird may not actually drive away the male of her own variety."

(d) *Personal Beauty and Sexual Selection*.—Mr. Wallace, who discovered the law of Natural Selection independently of Darwin, admits, as just stated, that "in birds the females do sometimes exert a choice"; but he adds that "amid the copious mass of facts and opinions collected by Mr. Darwin as to the display of colour and ornaments by the male birds, there is a total absence of any evidence that the females admire or even notice this display. The hen, the turkey, and the pea-fowl go on feeding while the male is displaying his finery; and there is reason to believe that it is his persistency and energy rather than his beauty which wins the day."

Briefly stated, the difference between the views of these two eminent naturalists is this: Darwin believes that in those cases where the sexes are not alike, the differences are due to the *males*, originally plain, having become modified through *Sexual Selection* for *ornamental* purposes; while Mr. Wallace believes that colour is a normal product in animal integuments, proportionate to their vitality, and that the sexual differences in ornamentation are due to the *females* having been modified through *Natural Selection* for the sake of *protection*.

Perhaps the best brief *résumé* Darwin has made of his views on this subject is given on page 421 of the *Descent of Man* (London edition, 1885), which may therefore be here cited in full: "If an in-

habitant of another planet were to behold a number of young rustics at a fair courting a pretty girl, and quarrelling about her like birds at one of their places of assemblage, he would, by the eagerness of the wooers to please her and to display their finery, infer that she had the power of choice. Now with birds the evidence stands thus: they have acute powers of observation, and they seem to have some taste for the beautiful both in colour and sound. It is certain that the females occasionally exhibit, from unknown causes, the strongest antipathies and preferences for particular males. When the sexes differ in colour or in other ornaments, the males with rare exceptions are the more decorated, either permanently or during the breeding season. They sedulously display their various ornaments, exert their voices, and perform strange antics in the presence of the females. Even well-armed males who, it might be thought, would altogether depend for success on the law of battle, are in most cases highly ornamented; and their ornaments have been acquired at the expense of some loss of power. In other cases ornaments have been acquired at the cost of increased risk from birds and beasts of prey. With various species many individuals of both sexes congregate at the same spot, and their courtship is a prolonged affair. There is even reason to suspect that the males and females within the same district do not always succeed in pleasing each other and pairing.

“What then are we to conclude from these facts and considerations? Does the male parade his charms with so much pomp and rivalry for no purpose? Are we not justified in believing that

the female exerts a choice, and that she receives the addresses of the male who pleases her most? It is not probable that she consciously deliberates; but she is most excited or attracted by the most beautiful, or melodious, or gallant males. Nor need it be supposed that the female studies each stripe or spot of colour; that the peahen, for instance, admires each detail in the gorgeous train of the peacock—she is probably struck only by the general effect. Nevertheless, after hearing how carefully the male Argus pheasant displays his elegant primary wing-feathers, and erects his ocellated plumes in the right position for their full effect; or again, how the male goldfinch alternately displays his gold-bespangled wings, we ought not to feel too sure that the female does not attend to each detail of beauty.”

Now it was this very case of the Argus pheasant that first shook Mr. Wallace’s “belief in ‘sexual,’ or, more properly, ‘female’ selection. The long series of gradations by which the beautifully-shaded ocelli on the secondary wing-feathers of this bird have been produced are clearly traced out; the result being a set of markings so exquisitely shaded as to represent ‘balls lying loose within sockets’—purely artificial objects of which these birds could have no possible experience. That this result should have been attained through thousands and tens of thousands of female birds all preferring those males whose markings varied slightly in this one direction, this uniformity of choice continuing through thousands and tens of thousands of generations, is to me absolutely incredible. And when, further, we remember that those who did not so vary would

also, according to all evidence, find mates and have offspring, the actual result seems quite impossible of attainment by such means."

According to Darwin's own admission (*Descent of Man*, p. 211), he advanced the theory of Sexual Selection because, in his opinion, Natural Selection did not account for the various ornaments and attractions of the males in question. Mr. Wallace, on the other hand, believes that Sexual Selection does *not*, while Natural Selection *does* account for these ornaments; so, in place of Darwin's view that the beauty of certain male animals leads the females to prefer them to their less ornamented rivals, he substitutes the theory that it is the superior vitality, persistence, and vivacity of the favoured males that fascinate the females, and that masculine beauty is simply a natural result of superior vigour and superabundant health.

Darwin doubtless errs in claiming an æsthetic sense for animals so low in the scale of life as butterflies and other insects, and in attributing to it such extraordinary effects in the development of personal beauty. What Mr. Wallace has done in *Tropical Nature* is to show simply that it is quite unnecessary to invoke the aid of so questionable an agency as Sexual Selection in order to account for the ornaments of animals; and that the fundamental principle of Darwinism, *Natural Selection*, accounts for everything.

He maintains that colour is a normal product of organisation, and that not so much its presence as its absence needs accounting for. White and black are comparatively rare and exceptional in nature,

while the various tints of red, blue, green, etc., are continually appearing spontaneously and irregularly in the integuments of animals. These irregular colours, if injurious to the species, will be at once eliminated by Natural Selection; but if useful for purposes of identification or protection, they will be preserved and intensified.

Now colour, Mr. Wallace continues, is proportionate to integumentary development, and is most conspicuous in the wings of butterflies and the feathers of birds, for the reason that, just as "the spots and rings on a soap-bubble increase with increasing tenuity," similarly the delicately-organised surface of feathers and scales is highly favourable to the production of varied colour-effects.

Colour being thus proportionate to integumentary development, we find next that integumentary development is, in turn, proportionate to vigour and vitality; the strongest animals having the largest feathers, scales, horns, etc. Hence the most vigorous and healthy animals are also the most beautiful, the most brilliantly coloured. And this correlation between healthful vigour and beauty is still more strikingly shown in this, that "The colours of an animal usually fade during disease or weakness, while robust health and vigour adds to their intensity. . . . In all quadrupeds a 'dull coat' is indicative of ill-health or low condition; while a glossy coat and sparkling eye are the invariable accompaniments of health and energy. The same rule applies to the feathers of birds, whose colours are only seen in their purity during perfect health; and a similar phenomenon occurs even among in-

sects, for the bright hues of caterpillars begin to fade as soon as they become inactive preparatory to their undergoing transformation. Even in the vegetable kingdom we see the same thing: for the tints of foliage are deepest, and the colours of flowers and fruits richest, on those plants which are in the most healthy and vigorous condition."

Add to all these considerations that "this intensity of coloration becomes most developed during the breeding season, when the vitality is at a maximum," and we shall be prepared for Mr. Wallace's summing up of his case:—

"If now we accept the evidence of Mr. Darwin's most trustworthy correspondents, that the choice of the female, so far as she exerts any, falls upon 'the most vigorous, defiant, and mettlesome male'; and if we further believe, what is certainly the case, that these are as a rule the most highly-coloured and adorned with the finest developments of plumage, we have a real and not a hypothetical cause at work. For these most healthy, vigorous, and beautiful males will have the choice of the finest and most healthy females; and will be able best to protect and rear those families. Natural Selection, and what may be termed Male Selection, will tend to give them the advantage in the struggle for existence; and thus the fullest and the finest colours will be transmitted, and tend to advance in each succeeding generation."

By this strong chain of reasoning (to which my brief *résumé* of course cannot do justice) Mr. Wallace shows that Darwin needlessly introduced the principle of Sexual Selection into animal courtship; and

at the same time furnishes a new confirmation of Darwin's compliment that he has "an innate genius for solving difficulties."

What makes Mr. Wallace's argument the more cogent is the fact that Darwin himself, in speaking of the lowest classes of animals, explains their beauty on the same principles as those which Mr. Wallace applies to the higher animals. Thus he says: "We can, in our ignorance of most of the lowest animals, only say that their bright tints result either from the chemical nature or the minute structure of their tissues, independently of any benefit thus derived." "It is almost certain that these animals have too imperfect senses, and much too low mental powers, to appreciate each other's beauty or other attractions, or to feel rivalry." "Nor is it at all obvious how the offspring from the more beautiful pairs of hermaphrodites would have any advantage over the offspring of the less beautiful, so as to increase in number, *unless indeed vigour and beauty generally coincided.*" And once more, "The sedentary annelids become duller-coloured, according to M. Quatrefages, after the period of reproduction; and this I presume may be attributed to their less vigorous condition at that time."

So far we have only considered the origin of animal colours in general. Mr. Wallace, however, has not only made clear the general connection between beautiful and vivid colours and health, but, by utilising his own researches and those of Mr. Bates and other naturalists, he has been able to show to what a great extent we can explain even the *particular* colours of the various classes of animals. He dis-

tinguishes four classes of animal colours—Protective, Warning, Sexual, and Typical.

(1) *Protective Colours*.—These “are exceedingly prevalent in nature, comprising those of all the white arctic animals, the sandy-coloured desert forms, and the green birds and insects of tropical forests. It also comprises thousands of cases of special resemblance—of birds to the surroundings of their nests, and especially of insects to the bark, leaves, flowers, or soil on or amid which they dwell. Mammalia, fishes, and reptiles, as well as mollusca, present similar phenomena; and the more the habits of animals are investigated, the more numerous are found to be the cases in which their colours tend to conceal them, either from their enemies or from the creatures they prey upon.”

(2) *Warning Colours*.—In this class, on the other hand, the object is not to conceal the animal, but to make it conspicuous. Certain species of gorgeously-coloured butterflies, *e.g.* are never eaten by birds, spiders, lizards, or monkeys, who eagerly feed on other butterflies. “The reason simply is that they are not fit to eat, their juices having a powerful odour and taste that is absolutely disgusting to all these animals. Now we see the reason of their showy colours and slow flight. It is good for them to be seen and recognised, for then they are never molested; but if they did not differ in form and colouring from other butterflies, or if they flew so quickly that their peculiarities could not be easily noticed, they would be captured, and though not eaten, would be maimed or killed.”

Mimicry is the name given to a second and still

more marvellous class of Warning Colours. They belong to defenceless creatures which so closely resemble other brightly-coloured but nauseous or dangerous animals that they are mistaken for the latter, and therefore left alone. *E.g.* "Wasps are imitated by moths, and ants by beetles; and even poisonous snakes are mimicked by harmless snakes, and dangerous hawks by defenceless cuckoos."

(3) *Typically*-coloured animals are those species which are brilliantly coloured in both sexes, "and for whose particular colours we can assign no function or use." This group "comprises an immense number of showy birds, such as Kingfishers, Barbets, Toucans, Lories, Tits, and Starlings; among insects most of the largest and handsomest butterflies," etc. "It is a suggestive fact that all the brightly-coloured birds mentioned above build in holes or form covered nests, so that the females do not need that protection during the breeding season which I believe to be one of the chief causes of the dull colour of female birds when their partners are gaily coloured."

(4) *Sexual Colours*, comprising those cases in which the sexes differ, and with which Darwin's theory of Sexual Selection is directly concerned. Through no *direct* fault of his own, Darwin leaves on his readers the impression—which has become almost a commonplace of conversation—that it is the general rule among animals for the males of each species to be more ornamented than the females. The truth is, however, that "with the exception of butterflies, the sexes are almost alike in the great majority of insects. The same is the case in mammals and reptiles; while the chief departure

from the rule occurs in birds, though even here in very many cases the law of sexual likeness prevails."

The reason why I have devoted so much space to Mr. Wallace's colour theories is to emphasise the truth contained in this last sentence ; the fact, namely, that even if Sexual Selection were accepted as an active principle, it would account in only a very limited number of cases for the personal beauty of animals, and the reader of Mr. Wallace's *Tropical Nature* and his *Contributions to the Theory of Natural Selection* cannot fail to be convinced that Sexual Selection does not even hold good in this limited number of cases, but that "the primary cause of sexual diversity of colour is the need of protection, repressing in the female those bright colours which are normally produced in both sexes by general laws."

Incidentally Mr. Wallace mentions as an additional function of colour the fact that it may serve as a *means of recognition* to the sexes. "This view affords us an explanation of the curious fact that among butterflies the females of closely-allied species in the same locality sometimes differ considerably, while the males are much alike ; for, as the males are the swiftest, and by far the highest flyers, and seek out the females, it would evidently be advantageous for them to be able to recognise their true partners at some distance off."

To me it seems that this function of colour is, next to Protection, its most important object, and that Mr. Wallace does not give it sufficient prominence. He says, in speaking of *Typical Colours*, that we can assign "no function or use for them." But why

should they not serve the sexes as a means of recognition at a distance? especially as colours can be recognised at a greater distance than forms. Many years before Darwin and Mr. Wallace wrote on this subject, Schopenhauer's genius anticipated this view of the matter. "The extremely varied and vivid colours of the feathers of tropical birds," he wrote, "have been explained in a very general way, with reference to their efficient cause, as due to the strong effect of the tropical light. As their final cause I would suggest that these brilliant plumes are the gala uniforms by means of which the species, which are so numerous there and often belonging to the same genus, recognise each other; so that every male finds his female. The same is true of the butterflies of different zones and latitudes" (*Welt als Wille u. V.*, ii. 381).

Schopenhauer of course errs in attributing, in his ignorance of Protective, Warning, and other colours, all the hues of birds and butterflies to this agency. But it is probable that whenever colours and other ornaments do not serve for purposes of protection (as *e.g.* the lion's mane and the horns of beetles, *vide Tropical Nature*, p. 202), they serve the purpose of sexual recognition of species. A case cited by Darwin to prove that quadrupeds take notice of colour, is very suggestive in this connection: "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."

It is probable, therefore, that in many cases the unique spots and stripes and colours of animals sub-

serve the special use of facilitating the finding of a partner ; and in this way they relate directly to the courtship and Romantic Love of animals. Thus we see how the Love affairs of animals may indirectly affect their Personal Beauty in a way quite different from that suggested by Darwin.

LOVE-CHARMS AND LOVE-CALLS

The same reasoning applies to the music of animals, vocal and instrumental, on which Darwin lays great stress. In his opinion, the music of some male animals serves to charm the females æsthetically, and thus gives to the best musicians special advantages through Sexual Selection. But the instances cited by him hardly warrant this conclusion, and seem rather to point to the inference that the function of animal music is chiefly to facilitate courtship, by making it easy for the females to discover the whereabouts of a male of the same species. The evidence tends to show that it is not the male whose voice is most mellow and melodious that catches the female, but rather the one who is most vigorous and persistent and has the loudest organ. As Jaques says in *As You Like It*: "Sing it: 'tis no matter how it be in tune, so it make noise enough!"

Darwin himself quotes a naturalist's statement, that "the stridulation produced by some of the *Locustidæ* is so loud that it can be heard during the night at the distance of a mile ;" and such cases as "the drumming of the snipe's tail, the tapping of the woodpecker's beak, the harsh, trumpetlike cry of certain waterfowl," though Darwin tries to dispose of them

on the ground of a difference in æsthetic taste, nevertheless incline one to the belief that the music of the forest troubadours is not so much intended to gratify the æsthetic taste of the female as to guide her to the spot where the male awaits her; for, contrary to common opinion, it is the female in these cases that searches for a male and not *vice versa*. Montagu, for instance, asserts that "males of song-birds and of many others do not in general search for the female, but, on the contrary, their business in spring is to perch on some conspicuous spot, breathing out their full and amorous notes, which, by instinct, *the female knows, and repairs to the spot* to choose her mate." And Dr. Hartman, speaking of the American *Cicada septemdecim*, says: "The drums are now heard in all directions. This I believe to be the marital summons from the males. Standing in thick chestnut sprouts about as high as my head, where hundreds were around me, I observed the females coming around the drumming males." And, says Darwin, "the *spel* of the blackcock certainly serves as a call to the female, for it has been known to bring four or five females from a distance to a male under confinement; but as the blackcock continues his *spel* for hours during successive days, and in the case of the capercailzie 'with an agony of passion,' we are led to suppose that the females which are present are thus charmed."

There appears to be no *direct* evidence, however, that female birds are more *charmed* by one male than another, and prefer him on account of his superior song, as the theory of Sexual Selection postulates. And when we remember that likewise

there is no evidence that birds, etc., are ever influenced in their choice by the superior colours of certain males, and that in fact it is the rule for the female to follow passively the most vigorous and victorious male, we are brought back to the conclusion with which we set out—that it is not the superior songster who wins the female by charming her, but the loudest and most persistent songster, by guiding her to the courting-place.

Darwin himself evidently felt the weakness of his position, for he constantly speaks of “love-charms or love-calls” in the same sentence. Thus, “the true song of most birds and various strange cries are uttered chiefly during the breeding-season, and serve as a charm, or merely as a call-note, to the other sex.” Again: “It is often difficult to conjecture whether the many strange cries and notes uttered by male birds during the breeding-season serve as a charm or merely as a call to the female.” The distinction between love “charms” and mere “calls” is of course of the utmost importance. For if male song charms the females and influences them in their choice, we have Sexual-æsthetic-female Selection. But if the male song merely serves as a call to the female and as a sign of species-recognition, then Natural Selection accounts for everything, because the most vigorous, loudest, and most persistent male will have the choice of the most numerous females brought to his side by his musical efforts.

LOVE-DANCES AND DISPLAY

There is one more important link in the chain of Darwin's reasoning, which must be broken before his

theory of Sexual Selection can be regarded as demolished. The mad antics of the blackcock and other birds have been already referred to ; and some of the lower animals seem to endeavour to surpass them, as, for example, the male alligator, who strives to attract the attention of the female by splashing and roaring in the water ; "swollen to an extent ready to burst, with its head and tail lifted up, he spins or twirls round on the surface of the water, like an Indian chief rehearsing his feats of war." "To suppose," says Darwin, "that the females do not appreciate the beauty of the males, is to admit that their splendid decorations, all their pomp and display, are useless ; and this is incredible."

But are there no other ways of accounting for all this "pomp and display"? Certainly, several of them. We have seen that the most vigorous males are those which are most highly ornamented, and that it is the vigour and vivacity of the males that seems to decide the choice of the females where there is any. Now instinct, *i.e.* inherited experience, teaches the female the connection between vigour and display of ornament, and influences her choice accordingly. Again, the males indulge in their display for the purpose of arousing the attention of the passive female. This supposition is rendered the more probable by Darwin's admission that "we must be cautious in concluding that the wings are spread out solely for display, as some birds do so whose wings are not beautiful."

A third motive of display is the need of finding an outlet for overflowing nervous energy and excitement. To this Mr. Wallace refers as follows : "At

pairing time the male is in a state of excitement and full of exuberant energy. Even unornamented birds flutter their wings or spread them out, erect their tails or crests, and thus give vent to the nervous excitability with which they are overcharged." "It is not improbable," he continues,—and this suggests a fourth use of display—"that crests and other erectile feathers may be primarily of use in *frightening away enemies*, since they are generally erected when angry or during combat."

A fifth motive of display is suggested by an analogy furnished by human butterflies and birds of Paradise. Among animals where the sexes differ, it is commonly the male who is adorned the most. With us it is the women. But woman's fineries are not intended to charm the eyes of men, but to excite one another's rivalry and envy. Now it seems that male birds, with whose plumes our heartless women are so fond of decking themselves, are guilty of an analogous weakness. They will sometimes display their ornaments, says Darwin, "when not in the presence of the females, as occasionally occurs with grouse at their boly places, and as may be noticed with the peacock ; this latter bird, however, evidently wishes for a spectator of some kind, and, as I have often seen, will show off his finery before poultry or even pigs. All naturalists who have closely attended to the habits of birds, whether in a state of nature or under confinement, are unanimously of opinion that the males take delight in displaying their beauty." And, once more, "with birds of Paradise a dozen or more full-plumaged males congregate in a tree to

hold a *dancing-party*, as it is called by the natives ; and here they fly about, raise their wings, elevate their exquisite plumes, and make them vibrate ; and the whole tree seems, as Mr. Wallace remarks, to be filled with waving plumes."

But if it be the unanimous opinion of naturalists who have closely studied the habits of birds, "that the males take delight in displaying their beauty," why should not the females also take pleasure in witnessing this display? Perhaps they do, sometimes ; for even Mr. Wallace admits that "the display of the various ornamental appendages of the male during courtship may be attractive" to the female. But there is a world-wide difference between this assertion and the doctrine that the females are so greatly and so constantly influenced by their æsthetic taste that they always prefer among males those that are slightly more beautiful than the others, thus increasing their personal beauty by transmission. This is an assumption unsupported by facts, and rendered unnecessary because Natural Selection accounts for all the phenomena in question.

Admiration of Personal Beauty does not appear, therefore, to enter noticeably into animal love, except in so far as a slight amount of æsthetic taste may be admitted in birds. This taste may be strengthened by the sight of the brilliant masculine ornaments during the season of love being associated with the remembered pleasures of courtship.

Indirectly, however, female animals promote the cause of beauty by preferring the more healthy and vigorous individuals, who are commonly also the most beautiful ones. And is not the same true of

females of the human persuasion, who likewise are much less influenced in their choice by the beauty than by the boldness, energy, vivacity, and "manliness" of their suitors? It seems to hold true throughout nature that the female's Love is weak in the æsthetic element, her taste being little developed and too often neutralised by unconscious utilitarian considerations.