sexual cells known as spermatozoa, is a male; an organism containing the tissue which produces ova is known as a female; one producing both ova and spermatozoa is a true herma­phrodite; and one producing neither, if it belong to the sexual generation, is known as a neuter, although neuters are for the most part incomplete females. The primary sexual tissues and the gametes are described in the article Reproduction (*Animals),*

Associated with the presence of the primary reproductive organs there may be a large number of other characters, and attempts have been made to classify these as secondary and tertiary sexual characters. It is impossible to define a series of logical categories in which any accessory character will find its inevitable place, but a convenient practical distinction first made by John Hunter may be drawn between characters directly auxiliary to the processes of reproduction and those which, although limited to one sex, are not immediately connected with reproductive processes. We may then make the division into (1) Primary Sexual Characters (A. *Essential:* power of producing respectively ova and spermatozoa. B. *Auxiliary:* possession of sexual ducts and reservoirs, intromittent and copulatory organs, organs associated with oviposition, gestation, parturition, and nutrition of the immature young in any stage); and (2) Secondary Sexual Characters (differences between the sexes in size, shape, appearance, ornamentation, armament, colour and coloration, voice, and instincts and habits not directly associated with the reproductive processes).

Those characters which are here grouped as primary are described in the article Reproduction. It is sufficient to repeat that in many animals only the essential primary characters are present. There is much diversity in the possession of secondary sexual characters, and in many cases these apparently are absent. Among mammals it is impossible to distinguish the sex without examination of the reproductive organs or observation of the sexual habits, in such cases as the domestic cat, the tiger and many other feline animals, hyaenas, bears, rabbits, hares, mice and a vast number of others. So also among birds there are many cases where the sexes are alike, as for instance, some humming- birds, parrots, owls, cranes, kingfishers, and many small birds such as robins and hedge-warblers. In reptiles and batrachians, in fish and a very large number of invertebrates there are no visible secondary sexual characters.

C. Darwin, in the portion of the *Descent of Man* devoted to “ Selection in relation to Sex,” brought together what remains the most complete and valuable account of the existence and distri- bution amongst animals of secondary sexual characters, and it would be impracticable here to give more than the most summary description of the groups of facts involved. Among Crustacea the sexes frequently differ, but in most cases the differences concern auxiliary primary characters, such as the possession of intromittent and clasping organs. Differences in size arc frequent; in the higher Decapods the males and in the lower Crustacea the females frequently being larger, the disparity being extreme in some of the parasitic Copepods and Isopods where the males are minute and attached to the females, whilst in the Cirripedes, as Darwin himself discovered, very minute complementary males may live as parasites in the mantle cavity of large hermaphrodite or female forms. Amongst Arachnids conspicuous differences in colour and size occur, the males generally being smaller, more active and possessed of relatively longer appendages, and more highly decorated. Amongst Insects, the differences between the sexes may be very great, quite apart from those relating to intromittence, prehension of the female, oviposition, or the higher development of sense organs by which the males can more readily seek out the females. In many cases the males are winged, the females wingless and grub-like. In a few instances, the males are highly pugnacious and are furnished with special weapons for fighting with their rivals. Amongst the Homoptera and Orthoptera there are many instances where the males possess organs capable of producing loud sounds, and these are rudimentary or absent in the females, whilst in other cases, both sexes produce call-notes. Particularly amongst the Coleoptera, the males may differ very greatly from the females in the shape of the body and may be decorated with extraordinary growths of the head and thorax. The most notable sexual differences are in coloration, and whilst there are many instances where both sexes are inconspicuous, and a few where both arc brilliant, there are still more where the males differ from the females by the display of more conspicuous patterns and of brighter colours. It may be said of Insects in general that it is the more common case for secondary sexual characters to exist in such a degree that the sexes may be distinguished at a glance.

Among Fishes, secondary sexual characters are common. Spines are developed on the head and pectoral fins of the males of some Rays, but it is probable that these may be auxiliary primary char­acters, useful in the prehension of the female. In the male salmon, a cartilaginous projection, developed during the breeding season, appears on the upper surface of the point of the lower jaw, whilst in old males the jaws become hook-like and the teeth are greatly in­creased in size. In the thornback, the adult male has the teeth sharp-pointed and backwardly-directed, while those of the female are flat and pavement-like. In almost all fishes the males when adult are smaller than the females, and may be much smaller. Beards of stiff, hair-like structures, elongated processes of the fins, tubercles and many other structures that may be classed as ornaments, because their function is unknown, occur in males and are absent in females. Differences in pattern and colour are extremely frequent, become much more marked in the breeding season, and are of such a nature that the males are more conspicuous. Among Batrachia, differences between the sexes in size and general shape are not striking, but there are many instances of' the males exhibiting crests, or special processes which may be classed as ornaments, and peculiar patterns and bright colours, during the breeding season.

Secondary sexual differences appear in the vast majority of birds. The shape seldom differs markedly, but differences in size are common, sometimes, as in birds of prey, the females, and sometimes, as in the allies of the domestic fowl, the males being larger. In a large number of instances the males are very pugnacious and are better armed, the bones and musculature being heavier, the beaks and claws stronger, while spurs or knobs on the wings and spurs on the legs may be present only in the males or be relatively small in the females. Special ornaments such as crests and wattles, combs, carbuncles, excrescences of the skin, and elongated or peculiarly shaped feathers are extremely frequent, and are developed or intensified in the breeding season, and in the vast majority of cases confined to the males. The voice almost invariably varies with the sex, is associated with the breeding period and is much more highly developed in the male, whilst structural developments such as modifications of the trachea, vocal sacs and resonators and differences in the larynx are frequently present and on the whole distinctive of the males. Differ- ences in colour and pattern are extremely well marked, and these are well known to be associated with the breeding period, which in many cases is preceded by a moult, after which the sexual plumage is assumed, or the colour of the naked parts intensified. In a few exceptional cases such as some button-quails (*Turnix),* painted snipes *(Rhynchaea),* phalaropes *(Phalaropus),* and cassowaries, the females exceed the males in size and brilliancy, and it is interesting to notice that in such cases the usual distinction of habit may be reversed, the females being pugnacious, aggressive, and courtiers of the males, whilst the latter arc shy and may attend to the brood. Such ex- ceptions are so rare that they may be called abnormal, for the rule among birds is that where secondary sexual characters are displayed, ornamentation, voice, brilliant pattern and colour, pugnacity and amorousness are distinctive of the male. Secondary sexual differ- ences of the same nature arc abundant among mammals. The males are usually larger and have greater strength with corresponding bones and muscles, and courage and pugnacity. Special weapons of offence or defence are common and are usually limited to the males or more highly developed in them ; familiar instances are the horns of cattle, sheep and antelopes, the canine teeth, the mane of the lion. The antlers of the stags are certainly used in combats between the males, but in their more extreme development they may be classed as sexual ornaments. The males of many mammals emit powerful odours during the breeding season, whilst their voices, whether as a battle cry or a call to the female, are frequently more powerful. Crests, tufts and mantles, rudimentary in the female, conspicuous in the male, are extremely common. Differences in pattern and colour are rare except in monkeys, but when these exist they are usually found in the male.

The scxes, then, are distinguished by primary and secondary characters, these two categories being convenient rather than logical. The real dividing line is between the essential primary sexual character, the presence of a male or female gonad, and the various auxiliary and secondary differences which appear in every grade of elaboration. It is to be noted, moreover, that all the other sexual characters depend on the activity of the essential primary character. Immature males and females are closely alike; the auxiliary and secondary sexual characters almost invariably begin to appear only when the gonads become mature, and fade away when these are injured or destroyed by accident, disease, senescence or artificial interference, and finally, when the activity of the gonads waxes and wanes periodically, there is a corresponding periodicity in the display of the secondary char- acters. A number of observations and experiments support the conclusion that the gonads, in addition to their obvious function of producing the sexual cells, discharge secretions into the blood and tissues, and that these internal secretions or hormones.