CHAPTER XLIV.

1.—*Descent of Man.* (*a*) *Evidence of Man's Descent from some Lower Form.*

LIKENESSES. It is notorious that man is constructed on the same general plan as other mammals. In the early chapters of "The Descent of Man," the fact of this resemblance in general plan is worked out into special details, and a large number of facts are given in evidence of the striking oneness between man and the animals most closely allied to him. It will be convenient to arrange this evidence of similarity under the two heads of Homology and Analogy. Homology (from ὁμοιος = like, λογος = discourse) is likeness in *structure*; Analogy (from αναλογια) is likeness in *function*. The structural resemblances between man and his fellows will be enumerated first, the functional resemblances second.

(i.) Homologies. (*a*) In embryo. Man is developed from an egg $\frac{1}{125}$th of an inch in diameter, differing in no respect from the eggs of other animals. For some little time during the early stages of development it is impossible to distinguish the human embryo from that of an invertebrate animal. For yet further period of time, though it is possible to say, "We have here a vertebrate," it is not possible to say what kind of vertebrate. By degrees, however, as we study the development of this being, it is borne in upon us that we have a vertebrate, and then that we have a mammal under consideration. Truly the distribution of blood vessels in the front part of the body in the early time, and certain structures known as visceral arches also in the anterior regions of the body, leave us for a little while in doubt as to whether it be a fish or some higher vertebrate that we are studying; but in good time that doubt is dispelled, and it is clear to us that an air-breathing vertebrate is before us. The feet and the hands of this human being are developed in a manner

no different from the development of the feet of the reptile or the wings and the feet of birds. Development passes through many and many a stage before we can be assured what kind of mammal we are dealing with. For some time after it is clear that the animal is higher than fishes or reptiles or birds, it is not clear which member of the class *Mammalia* is presented to us, and it is only in the very latest stages of development that the young human being presents marked differences from the young ape. It would be wearisome to enumerate all the structures seen in the development of man that speak trumpet tongued of his origin from the lower animals. But a few for the comfort of the believers and for the refutation of the thoughtless may be noted. The heart that is to have four cavities hereafter is at first a simple pulsating vessel. The alimentary canal that is to have its own opening distinct from the genital and the renal apparatus, at first opens in common with these. The lower end of the vertebral column which is to be shortened and aborted, projects at first like a tail some distance beyond the rudimentary legs. The kidneys, with their highly complex structure, are represented at first by organs no other than the Corpora Wolffiana of fishes. The convolutions of the brain of the fœtus at the seventh month are identical with those of the adult condition of the lower monkeys.

(β) In adult. Passing from the embryonic homologies we find in the adult condition still further and overwhelming evidence of the oneness between man and his allies. Rudimentary organs—stupendous stumbling blocks in the narrow sunless path of the Special Creationist—are as so many aids in the journeying of the Evolutionist. A rudimentary organ is a part that has not attained full development structurally, and that does not perform any definite function. Rudimentary organs, on the theory of Special Creation, are not comprehensible. To the believer in deity, they say, "Your god is a blunderer." Here is an organ occupying room, absorbing blood material, and making no return in the way of work to the body corporate. Rudimentary organs in biology are as certain classes of society in sociology. These latter occupy room, they absorb so much of the results of production, and they make absolutely no return to the body politic.

I will arrange these rudimentary organs in the order that

is familiar to those who have studied Comparative Anatomy and Physiology, or Human Anatomy and Physiology, under my guidance. The order wherein the facts as to any given animal or class of animals are arranged is as follows: Structure, Digestion, Absorption, Circulation, Respiration, Secretion, Nervous System, Sense Organs, Motor Organs, Reproduction, Development. We find rudimentary organs of deep significance in man connected with his structure, his digestion, his sense organs, his motor organs.

1. Structure. The hair-covering. One of the great distinctions often loudly insisted upon between man and the lower animals is the general hair-covering of the latter and the restriction of hair to certain regions of the body of the former. Therefore, of course, cry the unthinking, man is a Special Creation. But against this hypothetical distinction the following facts, very difficult of explanation on the Special Creation theory, very understandable upon that of Evolution, are to be urged. There are rudiments of hair over the greater part of the body-wall. Let the reader hold the hand up and see the light glinting athwart the back of the fingers. He sees light-tinged several very small hairs. They are rudimentary. Of what physiological value are they? Why are they there on the theory of Special Creation? On the theory of Evolution they are intelligible enough. They are relics of the past, remnants of the whilome universal hair-covering of ancestral bodies.

Again, the fœtus during that dim, strange life within the mother is, at the sixth month, thickly covered with fine, wool-like hair, named by the doctors lanugo. Bearing in mind the fact that early stages of the higher animals are largely identical with adult conditions in the lower, we comprehend this covering from top to toe with fur. On any theory other than that implying man's ascent from the lower animals, it is incomprehensible.

Again, at times are born of normal parents very terrible beings. They are, save in their origin, not human. With small skulls projecting horribly above the eyebrows, with brains smaller and smoother than those of their more happy brothers and sisters, with projecting jaws, of feeble, very feeble intelligence, unable to acquire the power of speech, inattentive but full of imitative quickness, strong, active, ever on the move as to body and as to face, climbing and crawling on all fours,

and not walking erect—these strange beings are covered from head to foot with hair. What *is* the meaning of this? Is the blasphemer of man and nature ready, as he looks upon beings such as these, to repeat his shibboleth of man made in the image of god? Was god ever of this form and uncomeliness? That such talk as this should still be rife throughout the poor world! The Special Creationist, one of these microcephalous (μικρος = little, κεφαλον = brain) idiots born of man and woman, should for ever smite with silence. To the Evolutionist, sad as is the sight, there is a lesson and an inspiration. This is to you a reversion to the old order of things, a testimony as to whence you have arisen. This is to you also an inspiration towards that struggle after yet loftier conditions that is the heritage, the possession, and the bequest of each true heart.

Lastly, it is to be observed that the lower a race of man, and the lower the individual man, the more marked is the hair-covering. Your savage race, your savage individual, are much more bedecked with the ancestral covering than are the cultivated peoples. The huge, strong animal man, all muscle and bone, and largely devoid of thought, has shaggy limbs and deep chest hair-shielded.

The tail. The foolish folk who are hopeful of dismissing great scientific truths with a sneer or a smile are for ever asking what has become of man's tail. It is late in the day to point out that this is a question betraying the ignorance of ordinary Anatomy that is habitual with the foolish folk. In the first place, the higher apes have no more of a tail than has man. Again, man has a tail. It is rudimentary, but it is present. The os coccygis, or bone of the caudal vertebræ at the lower end of the vertebral column, consisting of four or five vertebræ reduced to the most simple and aborted form, is a rudimentary tail. Why should this functionless structure be present at all, if man is made in god's own image? Again, in the embryonic condition of man there is present a very respectable tail. Finally, in certain diseased conditions, the human being reverts to the old ancestral form, and a caudal appendage appears.

The humerus. The bone that extends trom the shoulder to the elbow is called the humerus (*humerus* = shoulder). In the Carnivora, as dog, lion, there is a hole just above the lower end of the bone, where it is about to enter into the

elbow-joint. This hole is just above the two prominences to be felt by one who will grasp the elbow sideways between finger and thumb. These prominences are the condyles of the humerus (κονδυλος = knuckle). Hence the hole (*foramen* = hole) immediately above (*supra* = above) these condyles is the supra-condyloid foramen. The Carnivora possess this aperture. It transmits in them the large nerve and generally the large artery of the arm. And such protection in transmission is of great value. For the Carnivora, for the most part, strike out the life of their prey with mighty down-sweep of the arm. Their huge arm-muscles contract with enormous power. It is well, therefore, that the delicate nerve and artery, on which too great pressure would work injury, should thus be protected. In some of the order Primates, the order of monkeys, apes, and man, these foramina are always present. And in the highest, man, there is generally a trace of this passage, and in many cases it is well developed.

Hard by the supra-condyloid foramen is another lower down and midway between the two condyles. This is the inter-condyloid foramen, common in lower mammals, in man-like apes and occasionally present in man. Of this our author writes: "It is remarkable that this foramen seems to have been much more frequently present during ancient than during recent times."

2. Digestion. Consider the wisdom-teeth of man. They are the four hindmost teeth, two in each jaw. These are cut, say the books, between the ages of 17 and 25. These are cut, say the dentists, never at all in many cases. Admittedly they appear comparatively late in life. The opinion is held strongly by many of those best able to judge, that in many cases they never appear. Many persons well over the limit age of twenty-five have not cut all their wisdom-teeth. The writer possesses only 1·5 out of 4. These teeth then, coming late, giving much pain at their advent, often giving much pain during their sojourn in the jaw, necessitating in many cases removal that is proverbially not unaccompanied with pain, too far back in the mouth to be of any value in masticating the food, present insurmountable difficulties on the theory of Special Creation. But to Evolution they are, as are all observed facts, a help and not a hindrance. They are structures that are dying out from

disuse. They are on the path to become rudimentary organs. Possibly many centuries hence only the merest rudiments of them will be even discoverable by the dissector. These rudiments will to the anatomist of the future present no difficulty, as in his time the fetishism of Special Creation belief will have passed wholly and Evolution will be the belief of all. In our jaws, the lower whereof is in outline well-nigh rectangular, teeth in such a position as the wisdom-teeth can do no work. In the jaws of our progenitors with an obtuse-angled lower jaw they would have been of some use. And so at this hour they are dying out.

Cæcum. The alimentary canal of man has many parts ranging one after the other. The gullet or œsophagus leads into the stomach. That organ opens into the small or narrow intestine and this again into the large or broad intestine. Of the large intestine there are three divisions. And the first of these is the cæcum. It is so named from *cæcus*, blind, as the small intestine does not join end on to this first region of the large but runs into it a little distance from one end. And this end is closed or blind. So that a body passing down the small intestine into the cæcum would have for a moment choice of routes. It might run a little way downwards to find its passage further barred to it by the wall of the blind end of the cæcum or it might at once turn upwards into the pervious continuation of the large intestine. To this cæcum is attached in man a rudimentary organ. From its narrowness and outward aspect it is named *appendix vermiformis* or worm-shaped appendage. In man it may be absent or it may be largely developed. It is only hollow throughout a portion of its length. The end one-third or one-half is always solid. $^4/_5$ of an inch in length, of diameter $^1/_3$ of an inch. It is to man useless. Nay, it is worse than useless. It is at times a special death-dealer. Small, hard bodies as the seeds of fruits entering the appendix cause inflammation and death. In the animals lower than man this organ is of great size and functional moment. That of the orang is long and convoluted. The vegetable-eating animals have a long appendix, as the student for the first time dissecting a rabbit knows. Once again, what significance has this organ on any other view than that man is descended from an animal in which the appendix was of size and use?

3. Sense-organs. Ear. If the reader will run his or her finger carefully along the outer margin of the ear from below upwards, the finger as it nears the summit of the organ will encounter a tiny blunt projection. It is so small that it is often not perceptible to sight. Touch will however always discern it. Going from below upwards the projection is perceived just as in the upward passage the front face of the top-joint of the finger ceases to feel the gentle pressure of the inner fold of the ear. This strange projection is a vestige of formerly pointed ears. The eye is supposed to have only two eyelids. But a cursory examination of the inner corner of the eyeball next to the nose reveals a small red fold known technically as the caruncula (a wattle on a cock's head) lachrymalis (lachryma = tears). The ugly name denotes the connexion of the red fold with the tear apparatus. Indeed, the tears formed by the lachrymal gland that is upon the outer and upper part of the eye flow athwart that organ constantly, for we are weeping imperceptibly all life long, and pass through two holes in the caruncula into the nasal cavities. This small red fold is a rudimentary third eyelid. Watch a bird's eye, an owl's if you can get one. You will see every now and again a fold flit horizontally across the eye. The bird winks transversely. It has a large thin eyelid that is constantly drawn from inner to outer side of the eye by its own special muscle. All birds, all reptiles, many lower mammals, possess the structure. In man it is rudimentary and as an eyelid is functionless.

4. Motor organs. The muscles of the human frame furnish other examples of instructive rudimentary organs. A horse much worried by summer-flies whisks off the reachable ones by his tail. But those who know the parts of his body out of reach of the whisking organ are many. And of these tormentors he gets rid by a skin-twitch, that is as an earthquake to small insects. This twitch of the skin is effected by a muscle rejoicing in the name *panniculus carnosus* (carnosus=fleshy) resident in the skin. Of this muscle we have remnants. A thin layer in the neck called the platysma myoides (πλατυς=flat, broad, μυων=muscle, ειδος) certain small bundles of tissues met with near the shoulder, the scalp muscle, control over which gifts its owner with

much power of amusing children by moving the skin of the head, all are fragments of the *panniculus*.

But the muscles of the external ear are the most interesting remainders. Every one has them. Very few can make them contract. An excellent example of function-change preceding structure-change. The function of contraction has disappeared ere the structures have been eliminated. In the lower animals these muscles are of use in directing the ear soundwards. To us they are useless. Even those who have the power of contracting these muscles at will, of whom fruitless but persistent endeavor makes one think with unreasonable bitterness, find their unique accomplishment of no further value than as a source of mirth to the little folk.

CHAPTER XLV.

(ii.) *Analogies.*

(ii.) ANALOGY. It is not too much to say that every single function of the body of a living man is performed by him in like fashion to the performance of the body-functions of his closest allies. His digestion, absorption, circulation, respiration, methods of secretion, the actions of his nervous system, of his sense organs, of his motor organs, and of his reproductive system differ in no essential from the functions of the animals most closely allied to him. It is impossible to mention any real physiological difference between human beings and the other higher members of the order Primates.

It would be wearisome to the non-technical reader to trace out the physiological unity of man and his fellows in all minute details. It will be better to select a few striking illustrations that will come home to everyone.

(α) Parasites. The human body is infested externally and internally by animal parasites that are, of course, far lower in the scale of organisation than their host. But these parasites are not peculiar to him. The same beings that render his life a burden to him make miserable the existence of animals other than man. He has no prerogative of parasitism. He shares his tormentors in common with the animals to which he proudly boasts himself superior. This unity of parasitism argues a close similarity if not actual identity between the nature of the skin of man and his allies, and between the nature of their internal organs. If the parasites are identical the habitats of the parasites cannot be very dissimilar.

(β) Lunar periods. There is a mysterious law connecting certain normal processes of animal bodies with the recurrence of particular phases of the moon. We name it law not enter-

taining any belief that such connexion is the result of the decision of some outside power. A law of nature is only the verbal expression of certain connected phænomena that follow one after the other in regular sequence. We call it mysterious because at present it is not possible to explain the connexion between the body phænomena and the lunar periods. The growth and duration of various diseases, the process of gestation and yet other processes connected with the reproductive function follow definite periods that are usually expressed in terms of one or more months. But this remarkable phænomenon is not peculiar to man. Other Primates, other Mammals, other Vertebrata, and even animals as low down as insects, are subject to the same law.

(γ) Diseases. As man does not stand alone in his parasitical relations so also he has no monopoly of disease. Every ailment that may affect him is liable to affect his inferiors. Even such a fashionable illness as a slight cold is not confined to drawing room tenors. Rengger found the Cebus Axaræ liable to suffer from catarrh with all its familiar symptoms. With this monkey also there was the same risk of the slight cold developing into something more serious. The Cebus in not a few cases suffered consumption and died of the disease. Nor let it be imagined that lung affections were the only ills to which the poor monkey flesh was heir. The list of its possible ailments is as extensive as that of a hypochondriac. Amongst them rank apoplexy, intestinal inflammation, and cataract in the eye. When the young ones were teething they were fractious, they cried, and in some cases had convulsions, and a few died of fever. As to the diseases that are known as contagious they are communicable from man to the lower animals and from the lower animals to man. Witness the terrible cases of hydrophobia passing from dog to man, of glanders from horse to man, of small-pox from cow to man. An ape has caught typhoid fever from its keeper and the keeper has caught typhoid fever from the ape. And all this proves that the blood and the tissues of the higher animals, including man, must be wonderfully similar. The microscope had revealed likeness in structure in the blood of all Mammals; chemical analysis had revealed likeness in composition; but this unity of disease speaks still more plainly as to the close

similarity both in structure and composition of the body tissues and the blood of man and apes.

(δ) The effect of drugs identical upon us and our neighbors. Opium, or chloroform, or quinine, or any other of the innumerable constituents of the pharmacopæia affect monkeys as man. The former easily acquire the taste for tea or coffee or tobacco, and the drug that especially acts upon the nervous system—alcohol—is no exception to this general rule. Nowadays, that the proofs of Evolution are becoming recognized by the most unwilling as overwhelming, almost the last room of the collapsing fortress that they defend is labelled nervous system. As to skeleton and digestive apparatus and lungs and heart, they are willing to recognize, they are willing to admit, there is distinction not difference. But according to them the nervous system of man is immeasurably superior to that of any other animal. It is interesting, accordingly, to find it recorded that alcohol, a drug acting on the nervous system, produces similar effects upon the monkeys to those produced upon ourselves. As human beings are variable in their behavior under the influence of alcohol, so are the monkeys. One will become quarrelsome and eager for the fray; settled melancholy falls upon the existence of another, and he sheds endless tears; a third is moved to exceeding moroseness, and a fourth to joviality. Though the conduct whilst under the influence of the drug is thus variable the sameness of the "next morning," so noticeable in man, is to be observed in them. They are cross and dismal, and wear the look of shame; they hold their heads, presumably aching, with both hands. The parallelism fails, however, in one point; on the next morning, the monkeys will not take a hair of the dog that bit them. Thus, Brehm. The present writer, however, is distantly acquainted with a monkey that had, alas, developed this human failing. It was a music hall monkey, and nightly, after its performance, drank itself into a state of intoxication ere it went to sleep. This creature, on the morrow, would drink, in quite patrician fashion, soda and brandy.

(ε) The healing of wounds. Man's wounds are repaired by the same process as that obtaining in the lower animals. Even the power possessed by lowly organized creatures of restoring parts that had been removed is, to some extent,

his. It is a familiar fact, that children born with double thumbs, after removal of the supernumerary digit, are subject to its re-growth.

(ζ) Reproduction. The whole process connected with the maintenance or extension of the number of the species "is strikingly the same, from the first act of courtship of the male to the birth and maturing of the young." Finally, monkeys are born in a condition that needs as much parental care as our own babyhood. And the supposed distinction in regard to the time taken ere the adult condition is reached hardly holds. It is well known, in tropical countries, maturity, at least as denoted by the possibility of reproduction, is much earlier than in our own climate. The observations upon the Orang seem to establish the fact of that same maturity being reached about the age of twelve or fifteen.

(η) Mental powers. We have seen that one of the last points of defence of the crumbling fortress of Special Creation is the structure and nature of the nervous organs. The evidence that has been already adduced might be accepted by many as accurate, whilst they would still complain that the higher functions of the nervous system were peculiar to man. They would admit the action of alcohol on the brain, but they would contend that the loftier mental functions are not common to man and the lower animals. It is necessary, therefore, to drive them also from this point of the stronghold.

In comparing the mental powers of man with other animals, it is essential to keep in mind that the comparison is not between the loftiest man and other Primates, but between man as a genus and the different apes as representative of other genera. If the highly civilised European be taken for comparison, of course the difference between his mental development and that of the Troglodytes or Gorilla is enormous. But such selection begs the whole question. It is necessary to compare the highest apes with the lowest man. The most ordinary person gives the name of man to a William Ewart Gladstone, to a microcephalous idiot, and to a Tasmanian savage. The Evolutionist has to show, what is indeed very easy of demonstration, that the difference between the brain powers of the higher apes and the lowest savage is very much less than the difference between the

brain powers of the lowest savage and the cultivated Englishman.

The study of animals scatters to the winds the common boast of the common mind that the higher mental powers are peculiar to man himself. There is no single function of the mind in man that has not its representation in the lower animals. 1. General. The perception of pleasure and of pain, which is at the base of all mental development, is clearly theirs as well as ours. Terror and suspicion, the outgrowths of the perception of pain, courage, ill temper, revenge, love for the opposite sex, for the offspring, and for the superior, jealousy—the outcome of love—pride, shame, magnanimity, all these are to be observed in the lower animals. Dogs suffer from boredom, birds feel wonder and exhibit curiosity. The principle of imitation runs far down through the animal kingdom. The power of attention is also present, and present as it is in man in various degrees in different individuals. "A man who trains monkeys to act used to purchase common kinds from the Zoological Society at the price of five pounds for each; but he offered to give double the price, if he might keep three or four of them for a few days, in order to select one. When asked how he could possibly so soon learn whether a particular monkey would turn out a good actor, he answered that it all depended on their power of attention. If when he was talking and explaining anything to a monkey, its attention was easily distracted, as by a fly on the wall or other trifling object, the case was hopeless. If he tried by punishment to make an inattentive monkey act, it turned sulky. On the other hand, a monkey which carefully attended to him could always be trained."

Those that have read the story of the return of Ulysses, or those that have kept dogs themselves, will not need to be told that those animals have excellent memories. Imagination, long held to be the especial prerogative of man, cannot be claimed as his alone. Your dog after a long day's ramble is lying in front of the fire asleep. Presently a tremor passes through his limbs. He moves his ears. The different muscles of his body twitch. He half rises; subdued growls and even short barks escape him. He is fast asleep all the while, but he is dreaming of the adventures of the day. How is it possible to dream without imagination? Reason

is said to stand at the summit of the faculties of the human mind. It is late in the day to give instances of reason in animals. He that may wish to read an accumulation of such instances will find them recorded for him in the first volume of this series. Professor Büchner's "Mind in Animals" (Geistesleben der Thiere) as translated by Annie Besant, is an answer to those who deny the possession of reason by the lower animals, and by the denial induce us almost to doubt its possession in certain cases by the highest.

Coming to more special cases. The use of tools, the idea of property, the construction of houses, language, abstract ideas, the sense of beauty, religious belief, have all been instanced as possessions of the human race alone. 2. Tools. The Tasmanians and the aborigines of Australia, confessedly men, had no tools at all, and the chimpanzee in a state of nature uses a stone to break open a nut. An American monkey in a state of domestication went further, and used a stone to break open boxes; and others of the race have been observed to use pieces of stick after the fashion of a lever. 3. Property. Very low savage races have little conception, if any, of the idea of property, and that the idea of property is not confined to man will be admitted by anybody who has ever seen a dog with a bone. 4. Houses. Some of the Tasmanians, to whom reference has been already made, had no houses whatever. The aboriginal Australians built a house each night, but abandoned it the next morning; and in this you have an interesting illustration of a transition stage towards a more complete and definite order of things. On the other hand the anthropomorphous apes in volcanic regions build for themselves temporary platforms, and thus escape the lava flow that occasionally devastates the forest ground. 5. Language. As to the Special Creation of language, if language mean the power of communicating between animals, language is very common indeed in the animal kingdom. Insects communicate with each other in countless instances; but it is usual to say that man has "articulate language." I would like a definition of "articulate." If it means language that can be understood by his fellows then the language of the lower animals is articulate. Again, let it not be forgotten that a child at first does not possess what we call articulate language at all; that in the course of its early months out

of its interjectional cries is gradually fashioned the more definite speech. Let it be remembered that one of the Gibbons—*Hylobates*—has a distinct octave of notes in its voice. Let it be remembered that a parrot can be taught to use definite words and to put them in definite order; and that the clicking language of the Caffre, and the grunting language of the Bushman are very little, if at all, higher than the collection of sounds that can be uttered by animals other than man. 6. Abstract ideas. The possibility of conceiving these could not have been developed in man until an advanced stage of mental Evolution, and probably not until after language had made considerable progress. But we have no right to say that the lower animals have not a conception of abstract ideas. They cannot tell us that they have; they cannot give us the name that they *may* be cognizant of for their mental conception. But we have no right to say that they do not possess the general concep- of goodness, kindness, or beauty. On the other hand, what conception of the abstract has the brutal and drunken man of the lower orders, or the dim-minded primeval savage?

7. The sense of beauty and its possession by many animals will come under discussion in the second part of this work.

8. Finally comes the question of religion. There is no evidence that man was aboriginally endowed with what Charles Darwin calls "the ennobling belief in the existence of an omnipotent God." Certainly savage races have been found in whom the conception of deity did not exist. But the belief in spiritual agencies as the cause of natural events appears almost universal. In the savage times every natural phænomenon not understood at all by the savage mind is referred to some supernatural agency. With the Tasmanian or the Australian every event is caused in this supernatural way. As he struggles a little further upwards from the lower animals, certain events whose history he begins to understand are eliminated from the category of super-naturally-caused phænomena. But a large residue exists still that he does not yet understand, and that he therefore continues to ascribe to spiritual action. He has passed into the stage of Fetishism. Still moving forwards Fetishism becomes Polytheism. The number of phæno-mena attributed to the supernatural are still fewer as the

number of phænomena that are now understood is increasing. From Polytheism Evolution leads him to Monotheism. A Monotheist laughs to scorn the idea of deity interposing in distinct details. He comprehends the nature of the storm, the movement of the planets, the ebbs and flows of human thought. He traces all these to their natural causes, and only retains a vestige of the older superstition in the vague belief that somewhere at the back there is a first cause. It will be seen therefore that Evolution of mankind in respect to religious belief has passed through the stages of no inquiry at all into causes; of reference upon enquiry of all phænomena to spiritual agency; of the reference of certain phænomena to multitudinous spiritual agencies, as in Fetish worship; of the reference of still fewer phænomena to still more defined and less numerous deities; of the reference of the myriad observed and understood phænomena to a single first cause; and is passing to the time when this one remnant will vanish and nature will be found to be complete in herself. Myriads of gods at the back of each individual event; thousands of Fetishes at the back of each of the enormous number of non-understood events; hundreds of gods at the back of each of the diminishing number of unstudied things; a trio of gods; and then a single god as first causes of all phænomena; and so through the myriads, the thousands, the hundreds, the three, the one, down to the None.

(θ) Moral sense. The last rallying point for the forces antagonistic to Evolution is the Moral Sense. Even the men that will admit that bodily structure and a large part of the mental functions are not special to man are loth to believe that what is named the moral sense is not a special intuition from a higher source given to men alone. It behoves the Evolutionist, therefore, to investigate the Evolution of this function of brain matter.

1. First, let it be observed that there are many men destitute of moral sense. Certain whole races habitually, and occasionally members of the highest civilised races, appear to have no conception of the distinction between right and wrong. The hardened criminal of the London slums cannot by any amount of tuition or punishment be brought to understand the difference between righteousness and wrongfulness.

2. Considering the Evolution of the moral sense, certain

principles are recognisable. The first essential to the development of the moral sense is the gregarious nature of animals. It is impossible to conceive of a solitary animal having any idea of right and wrong. A man living the whole of his life absolutely alone on a desert island, for example, could never know what society would praise as good, or what society would stigmatise as bad. He has no standard of reference whatever, and would live to the end of his days performing actions that gave him pleasure, avoiding actions which gave him pain, but without any rule of moral conduct, inasmuch as there would be none of his fellows to check him or to praise him in certain courses. But with animals living in a flock or tribe comes the first possibility of the development of the moral sense. This leads to the succeeding principles. 2. The social instincts would lead an animal to take pleasure in the society of its fellows, to sympathise with them, to perform services for them. 3. Memory comes into play. If, on occasion, the social instincts just mentioned were made to yield to some temporary impulse, for the moment stronger, but far less enduring and less frequently recurrent, a feeling of dissatisfaction would grow upon the mind. Nay, more! the society in which the animal lived would punish when the temporary impulse overcame the desire to do that which was good for all. That punishment, repeated and intensified, would gradually teach the lesson that certain actions were not to be performed, because they were opposed to the general well-being, and these actions would be labelled "Wrong." Such other actions as the society did not punish, inasmuch as they were in no sense opposed to the general well-being, would be labelled "Right." This is the manner of growth of the knowledge of right and wrong in the human child. At first the mind is probably a perfect blank. Certain actions are performed that give the child pleasure. These it soon learns to will. Certain other actions are performed that give the child pain, and these it learns not to will. First, then, its standard of the things to be done and the things to be left undone is entirely a personal one. But very early, society, at first in the kindly form of nurse or of mother, and later on in much harsher guise, points out that many acts yielding happiness to the individual conflict with the happiness of the race. The child learns that some of the actions towards

which it inclines, not clashing with the general well-being, are not punished, and these it labels "Right." It learns that other actions pleasurable to itself are productive of so much pain to others that they are punished, and these it labels "Wrong." And here the standard of what is to be done and what is not to be done is no longer a personal one. It is the standard of the society in which the individual lives. Hence, at first, the morality of the child has only reference to its own family circle, and the morality of the savage has at first only reference to his own tribe. The savage may be all things that do not become a man as far as outsiders are concerned, but for the tribe he must show bravery, endurance, and all virtues that help it in its struggle with other tribes. He may be as false and treacherous to his enemies as he pleases, and these are accounted virtues to him. And this savage state, in which morality extends no further than the limits of the tribe or nation, and does not enter into foreign politics at all, is reproduced amongst the inferior order of thinkers in so-called civilised nations in the political complications of to-day. But, in the higher stages of man's moral sense, the standard has no longer reference to the individual or to his own tribe. It covers a wider range. That action is good which tends to the welfare of the totality of human beings, and that action is bad which tends to lessen the sum of all the world's happiness. Then the narrow patriotism that stops at the borders of one's own land evolves into that higher form of patriotism, which, knowing no distinction of countries or of peoples, claims the whole world as fatherland. The stages in the Evolution of the moral sense thus far are reference to the happiness of the individual, reference to the happiness of the family or tribe, reference to the happiness of all men. 4. Given the power of language, whereby the wishes of the members of the same community can be expressed, that which we call public opinion would come into play in the making of the moral sense. 5. Habit, strengthening social instincts and impulses and obedience to public opinion, would play its part in the evolution of morality.

1. Gregarious nature of animals. That the lower animals in many cases live together in flocks is obvious enough. Any one that has been near a rookery would corroborate this. Other birds besides the much-cawing ones are gregarious. So are wolves, cattle, and monkeys. The commonest

service performed by members of a flock one for the other is warning of danger. Beasts of prey hunt in packs. The *Hamadryas* monkeys unite their forces to overturn a large stone too heavy for one, that they may seize upon the insects underneath. 2. Possibly the feeling of pleasure that certainly animals possess in their association one with another is an extension of the family affection. It would be strengthened by Natural Selection on account of the protection they would thus afford each to the other. 3. The more enduring social instincts triumph over the less persistent, and this is well, for though the occasional impulse may at times prompt man to a noble deed, far more generally it impels to mere personal gratification, and if this latter be the case retribution follows inevitably in pain of body or of mind. Dissatisfaction ensues, and there is resolve to follow the more universal impulse of aiming at the good of all in the future. He that is thus dissatisfied, that thus resolves, and that acts upon such resolution is the man that possesses a conscience. Even if the same momentary impulse yielded to affords the individual greater gratification than he would feel had he given way to the more enduring principle of action, yet is he conscious that the judgment of his fellows would be against him, and the dissatisfaction mentioned above ensues once more. It is only in the worst men that neither of these feelings comes into play and then the sole restraining motive is fear of punishment.

That morality is at first limited to the tribe is shown by the fact that the murder of individuals, suicide, the robbery of strangers, the strangling by the Indian Thug, slavery, the torture of enemies, faithlessness to strangers even with greatest fidelity towards fellow-tribemen, barbaric treatment of women—all these are not regarded in the savage races as immoral, and intemperance, inchastity, and even indecency in the earlier times, are regarded in no sense as evil. Out of this low, early form grows the higher morality that regards the good of all as the end of action.

And perhaps the highest stage of any moral culture is when a man has learned to be a law unto himself, not in the slavish and crude fashion of the young days, but in such manner that in his inmost heart of hearts it is actual pain if aught of his deeds or words, or thoughts even unknown

to the world are of such nature as to do harm to that world were they known of men. "Blessed are the pure in heart" is lofty moral teaching. It is well that certain men and women are afraid to do wrong because of their belief that their deity knows their actions. It seems that a higher morality is the possession of those who are afraid of doing wrong because their fellow men would know of their actions. But the highest morality appears to be where a man is ashamed of doing that which is wrong because he himself would know thereof.

CHAPTER XLVI.

(*b*) *Manner of development of Man from some lower form.*

(i.) GENERAL. (*a*) Variability. Man is an eminently variable animal. It is as difficult to find two individuals alike as the proverbial two blades of grass. The anatomist tells us that the teeth, the arteries, the muscles, all the internal viscera, are as variable in individuals as are their faces. And this diversity extends to the mental powers.

(*β*) Causes of variation. Of the causes of this variability we are, however, largely ignorant. But they would seem to be connected with the external conditions to which men are exposed. Associated with this cause are the effects of the use and disuse of parts. The familiar instance of the blacksmith's muscular arm points the moral of this last. If the eye is destroyed the optic nerve diminishes in size and becomes of lower organisation. The Papayan Indians, passing nearly the whole of their lives in canoes, have thin legs and thick arms. The Quechua Indians on the heights of Peru, breathing a rarer atmosphere than ordinary mortals, have chests and lungs of huge size.

(*γ*) Atavism. Reversion to the form of structure present in ancestral conditions is met with in man and points to the line along which he has evolved. The two-horned condition of the uterus and its slight internal longitudinal fold are connected with the fact that in many Mammals that organ is double. The malar or cheekbone on each side of the face is also double in some of the Primates and in other Mammals. This is a regular condition in the fœtus at two months, and in some men the bone remains double throughout life.

(*δ*) Correlated variation has been explained in our dealing with the Origin of species, and in man, as in the lower animals, occurs frequently.

(*ε*) Rate of increase. But for some check to increase,

man, like any other animal, would rapidly populate every square foot of the globe. The population of the United States would under favorable circumstances double its number in twenty-five years. If this rate of increase continued, in the course of 657 years there would be four men for every square yard of surface of the globe. Certain checks upon increase must therefore exist. The primary one is the difficulty of getting food. Severe epidemics and wars at times do their work. Periodical famines, accidents, infanticide, licentiousness—all are mentioned as checks to the unlimited increase of humanity. It is pleasant to reflect that the time is rapidly coming when less painful and more scientific means than these will be adopted by man himself, and thus prevent the necessity of the reduction of the surplus population by these cruel devices of a rigid and determined Nature.

(ζ) Natural Selection. Finally in considering the manner of development of man Natural Selection of course comes into play. To sum up, we have seen that man is variable, and, though the causes of the variations may not be clear, apparently they are the same and follow the same general laws as those which determine the variations of the lower animals. Man, like other animals, increases at present beyond his means of sustenance. Hence must follow struggle for existence, and then comes into play the principle of Natural Selection. The difference between the hands of the higher apes and of man is of such a nature that those of the human beings are better adapted for diversified uses. In the earlier times any animals presenting variation of the hands, thus adapting them more thoroughly for such different uses, stood a better chance in the struggle for life. Further, for many human actions it is necessary that the arms and the upper part of the body should be free, and this could only be if the body be erect. The gradual development of the erect posture then becomes possible, and it should be remembered that there is every gradation to-day between the Marmoset, habitually on all fours, and the erect man. With the erect posture would come advantage from a broader pelvis, a curved spine, and a head fixed well on the summit thereof. And all these changes have been attained. The erect posture would give the possibility of using weapons instead of teeth in warfare, and thus the great canines have

fallen into disuse, and the jaws become reduced in size. That the brain and spinal cord should increase under the agency of Natural Selection is obvious enough, as every variation in that direction would give better mental faculties, and better chance in the great battle. And so with all parts of the body and their functions. Not one of the slight differences between man and his allies exists that is not of such a nature that its gradual development would have been aided by Natural Selection, as each stage in that development would represent a greater capacity of the individual for dealing with surrounding life conditions.

And if we turn to the more purely intellectual and moral faculties the manner of development of man from the lower forms presents no more difficulty. Such faculties being of high importance to primeval man and his bulky progenitors would have been advanced through the survival of the fittest. The tribes possessing the largest number of men endowed with these advanced faculties would be likely to supplant other tribes. As we get rid in more or less barbaric fashion of our morally and intellectually low people, as those but poorly endowed do not stand the same chance of becoming wedded and producing children that the more highly intellectual possess, despite our sympathies, our hospitals, and our jails, there is a tendency to increase in the number and the standard of the intellectually able.

(ii.) The genealogy of man. Assuming then that the evidence is sufficient, and in truth I have given but a part of it, to establish the probability of man's origin from the lower animals, there comes the enquiry as to what is the exact line of descent. At present, advanced as is our zoological knowledge, it is questionable whether it is sufficiently advanced to trace out the line with unerring accuracy. Some parts of it, however, are at least discoverable. Charles Darwin does not follow Haeckel into the interesting and intricate genealogy that he suggests, but carries us thus far. Clearly man is a Vertebrate and a Mammal. He is also to-day recognised as one of the order, Primates, including Man, Gorilla, Orang, Chimpanzee, Gibbon, Baboon, Spider monkey, Marmoset, and Lemur. The old distinction Bimana (two-handed), and Quadrumana (four-handed)—the outcome of man's conceit—is for ever done away with. Man is to be classed zoologically with the Monkeys and the

Apes. Now the order Primates has three sub-orders. Anthropidæ (*ανθρωπος* = man, *ειδος* = likeness), including Man alone; Simiadæ (*Simia* = ape), Apes and Monkeys; Lemuridæ, the Lemurs. Consider the sub-order Simiadæ. This is divided into the Catarrhini (*κατα* = narrow, *ρις* = nose) or monkeys of the old world, with narrow nostrils, and the Platyrrhini (*πλατεος* = broad) or monkeys of the new world, with broad nostrils. Man, by the character of his teeth and the structure of his nostrils assimilates to the former rather than the latter. Again the Catarrhini or old world monkeys are split up into two groups. The lower comprises the non-anthropomorphous monkeys such as Semnopithecus, and the higher anthropomorphous, including the Gorilla, Chimpanzee, Orang, and Gibbon. As none of these last possesses a tail, or the ugly bare places highly colored that are borne by the other monkeys on the posterior regions of the body, and are called callosities, it is probable that some ancient member of the anthropomorphous subgroup of the Catarrhine division of the sub-order Simiadæ gave origin to man. It is hardly necessary to-day to point out the folly of saying that man has sprung from apes. No evolutionist has ever made so reckless and ridiculous a statement. All that the evolutionist contends for is that there is evidence that man and the apes have sprung from some common ancestral form. I subjoin a table of the classification of man and his allies.

PRIMATES	Lemuridæ	Lemurini		Lemur.
		Cheiromyini		Chiromys.
	Simiadæ	Arctopithecini		Marmoset.
		Platyrrhini		Spider-monkey.
		Catarrhini	Cynomorpha	Baboon.
			Anthropomorpha	Gibbon, Orang, Gorilla
	Anthropidæ			Man.

As the apes that appear most nearly allied to the probable progenitor of man are of the old world stock, the earliest man probably lived on the African continent. And if we are asked to produce fossil remains, or even living forms of the intermediate stages between him and us, we remind the inquirer of the imperfection of the geological record in the very region of the earth where probably man first appeared. We remind him again that intermediate forms are always

liable to be exterminated. The intermediate forms and man's brute progenitor have probably alike been slain in the battle for life. Almost certainly the anthropomorphous apes will in time be exterminated. Consider what will be the break then between man in a state of civilisation, far higher than ours, and some ape lower even than the Gibbon. Consider in those days how the sneering non-scientist will point still more triumphantly to the immense difference between man and any of the lower animals. Ah! man will be wiser then. Long ere the extinction of the anthropomorphous apes occurs, he will have learned the glorious lesson, so slowly being learned to-day, that man is ascended from a lower form of animal.

Following our teacher, we can trace the genealogy of man further back than the Primates. The Simiadæ are structurally closely connected with the Lemuridæ, the lowest division of the Primates. Without following Haeckel steadily down through the vertebrate sub-kingdom, Charles Darwin carries us at once to the lowest class of Pisces, or fishes. He holds that all the members of the vertebrate sub-kingdom are derived from some fish-like animal. Certainly each of the classes glides into the others. The Duckbilled Platypus or Ornithorhyncus of Australia connects the Mammalia with Birds and Reptiles. The fossil Pterodactyles connect the Reptiles and the Birds. The Icthyosaurians connect the Reptiles and the Fishes. The lowest of all in the vertebrate series is the strange Amphioxus or Lancelet, a vertebrate, but of the very lowest nature. The older naturalists placed it amongst the worms. Possibly this may be a persistent form of the progenitor of all the vertebrate sub-kingdom. Now the Lancelet or Amphioxus is strikingly similar to the Ascidian. The commonest form of Ascidian is a simple tough leathery sac with two openings, that the visitor to the Brighton Aquarium may see to-day by the dozen. This strange little being, far down in the animal kingdom, in its development, in the position of its nervous system, in its respiratory apparatus, and in a structure representing our vertebral column, more than suggests the Vertebrata, and therefore "we should thus be justified in believing that at an extremely remote period a group of animals existed, resembling in many respects the larvæ of our present Ascidians, which diverged into two great branches—the one

retrograding in development and producing the present class of Ascidians, the other rising to the crown and summit of the animal kingdom by giving birth to the Vertebrata."

CHAPTER XLVII.

(*c*) *On the Races of Man.*

WHETHER mankind consists of one or several species has been long a question with the Anthropologists, who, on account of the diversity of opinion amongst them, are divided into two groups, named Monogenists ($\mu o \nu o \varsigma$ = one, $\gamma \epsilon \nu o \varsigma$ = race) and Polygenists ($\pi o \lambda \upsilon \varsigma$ = many). The former hold that man consists of but one single species. The latter hold that there are several species of human kind.

(i.) Polygenist arguments, It is clear that the evolutionist will come under the former category; that is, he will believe that all the races of man are descended from a single primitive stock. First, therefore, comes consideration of the arguments in favor of the Polygenists. They are as follows :—

(α) The difference of appearance and characteristics in the races. The Negro, the Hottentot, the Mongolian, and the Englishman are clearly in many respects widely different from each other.

(β) The different climates they inhabit.

(γ) The long duration of these different characteristics. Negroes apparently identical with existing Negroes lived 4,000 years ago.

(δ) The sterility that is supposed to exist between individuals of different races.

(ii.) Monogenist arguments. (α) The races of man do not remain distinct when mingled together in large numbers in the same country. They blend. In Brazil is a mongrel population of Negroes and of Portuguese.

(β) The distinctive characters of every race are highly variable.

(γ) The so-called distinct species, that is the races of man, graduate into each other without any intercrossing.

Fourteen eminent naturalists have been asked as to into

how many species they would divide Man. Their answers are respectively, 1, 2, 3, 4, 5, 6, 7, 8, 11, 15, 16, 22, 60, and 63.

The extinction of certain races is a historical fact, and follows chiefly from the struggle for existence or the competition of tribe with tribe and race with race.

But after all, the more important question for us is as to the formation of the races. Accepting the view that man is a single species there are yet so many varieties in that species that the Anthropologist—and the Evolutionist must be something of an Anthropologist—is bound to attempt to explain the manner of development of the different races. All the explanations that have availed us in the study of the lower animals do not give us much help in the study of man. The effect of external conditions, even after exposure to them for a great length of time does not appear to be notable. Thus the naked inhabitants of Tierra del Fuego live on the Algæ or Seaweeds washed up by the summer sea on their rocky shore. The Botocudos of Brazil wander lazily through their tropical forests, leisurely devouring of the abundance of fruits. And yet these two races resemble each other almost exactly. So also the Esquimaux, feeding solely on animal matter, clothed with thick fur, living in the night of the world, at temperatures many degrees below the freezing point, differ but slightly from the Southern Chinese, whose food is vegetable, and who live naked lives under a hot glaring sky. Nor can the differences between the races of man be explained solely by the inherited effects of the use or disuse of parts. The principle of correlated growth also aids but little. Hence, the naturalist thirsting for and striving after better explanations than any of these leads us to the principle of Sexual Selection. Under the action of that great principle hereinafter to be studied, does he believe that the human races have been led along their development in diverging lines. By this not only the human race, but animals below it in the scale have been modified. Darwin enunciates the doctrine of Sexual Selection. Its enunciation and proof would have rendered his name immortal, even had not the yet greater generalisation of Natural Selection fallen from the same honored lips. With the statement that this principle is needed to explain the origin of the different races of man, we pass to the second part of the work.

CHAPTER XLVIII.

(2.) *Sexual Selection.*—(*a*) *Its principles.*

IN studying this great principle, that is to explain to us not only facts in connexion with the races of man, but many otherwise non-understandable facts in connexion with animals of less lofty organisation, we shall investigate—

(*a*) Its principles.

(*b*) Secondary sexual characters in animals lower than man.

(*c*) Secondary sexual characters in man himself.

(*a*) The principles of Sexual Selection. I will endeavor to state the broad general principle earlier in our investigation than its distinguished author states it. He, as usual, after his inductive fashion, gives the facts first and the generalisation after. I am inclined to think that when once a generalisation has been established irrevocably, it is best to give the student the result first, and then to enumerate the facts upon which it has been built.

(i.) The general principle of Sexual Selection is as follows. That individuals of one sex of certain species of animals, generally the male sex, have varied in external characters; that the females have, for some reason or another, selected these individuals that have thus varied, and have rejected their fellows who continued in the ordinary road; that this variation of the selected males, in consequence of their producing all the offspring, or more offspring than the non-selected ones, has been transmitted and intensified; that this process being repeated generation after generation has led from the first slight variation up to permanent characteristics of the male animal. So that Sexual Selection will imply the choice by the females of particular males possessing particular qualities, and the consequent increase of those particular qualities until they are marked and persistent.

That the males and females differ in their organs of repro-

duction is a self-evident proposition, and these differences are the primary sexual characters. But we are here concerned with differences not directly connected with the organs of reproduction, and these differences Hunter has called secondary sexual characters. With almost all animals there is a struggle between the males for the possession of the female. Hence the latter have the possibility of a choice, and would select one out of several males. Again, with migratory birds, the males arrive at the place of breeding ere the females come, and the advent of the first female means a contest on the part of several males for her possession. And yet, again, in several cases the males of a certain species greatly exceed in number those of the opposite sex.

(ii.) Numerical proportion between the sexes. The principle of Sexual Selection would be very easy of acceptation if it could be shown that there was a larger number of males than of females in a given species. Very wide inquiry has been made by Darwin into the matter, but the materials are, unfortunately, scanty. By one means and another, however, he has collected a considerable mass of data, but they do not in all cases tell in favor of his argument. In most of the domesticated animals the sexes are nearly equal at birth. Take race-horses for example. In 25,560 births, they presented 99·7 to 100 as the proportion between the male and the female. With man the male births in England are as 104·5, in Russia as 108·9, and with the Jews of Livonia as 120 to 100 females.

But in considering Sexual Selection, the question is not as to the proportion of the sexes at birth, but the proportion of the sexes at maturity. Here, again, however, an element of doubt comes in. With man, at all events, more males die than females during the early years. Nevertheless out of the immense number of observed cases the general conclusion is that the males of some few mammals, of many birds, of some fishes and insects, are more numerous than the females. Here are a few numbers to substantiate this proposition :—

Man in England, 1857 to 1866	104·5	males,	100	females
,, in Russia	108·9	,,	100	,,
Horses	99·7	,,	100	,,
Dogs	101·1	,,	100	,,
Sheep	96·7	,,	100	,,

Pigs	116·6	males,	100	females
Cochin Chickens	94·7	,,	100	,,
Lepidoptera	127·7	,,	100	,,

Polygamy, where one male unites himself with two or more females, would lead to the same result as inequality in number of the sexes. Now a large number of the higher animals are polygamous. The gorilla amongst Mammals, the Ruminant animals generally, the lion and the seal amongst the Carnivora, peacocks and pheasants amongst birds, and even the stickleback amongst fishes, are all polygamous animals.

(iii.) Again, it is to be noted that where there is difference in external appearance in the sexes it is the male which is in almost all cases modified, and careful investigation of the domesticated animal shows that the male is also more liable to vary. Where brilliant colors or the like external marks, which are to-day usually ascribed to the action of Sexual Selection, occur not only in the male but the female, the probability is that they have been acquired by the male first, and then, after a time, transmitted to the offspring of both sexes. This opens up exceedingly interesting questions in relation to variation, to transmission, and to sex. One simple principle induced by the naturalist from the immense body of facts is as follows. Variations that appear in either sex late in life are generally developed in that one sex alone, and conversely, variations which appear early in life in one sex are likely to be developed in both. Now the variations that Sexual Selection would take advantage of and aid in preserving, transmitting, and intensifying are those that appear principally not in the early years or months of the animal's existence. Hence they are liable to appear only in the one sex.

CHAPTER XLIX.

(b)—Secondary Sexual characteristics in the animals lower than man.

IT is necessary to remind the non-technical reader that the system of classification adapted by Darwin and still in the main used by scientific men to-day is as follows.

The kingdom Animalia is broken up into five kingdoms, Protozoa, Cœlenterata, Mollusca, Annulosa, and Vertebrata. Each of these sub-kingdoms is again divided into classes. The relationships of these classes to one another and to the sub-kingdom will be best understood if I subjoin a table giving the sub-kingdoms, classes, and examples of each.

ANIMALIA.

SUB-KINGDOM.		CLASS.	EXAMPLE.
Protozoa		Gregarinida	Gregarine.
		Rhizopoda	Amœba.
			Foraminifera.
		Infusoria	Vorticella.
Cœlenterata		Porifera	Sponge.
		Hydrozoa	Hydra.
		Actinozoa	Sea Anemone.
Mollusca		Polyzoa	Flustra.
	Atriophora	Ascidioida	Ascidia.
		Brachiopoda	Terebratula.
	Branchiophora	Lamellibranchiata	Oyster.
		Gasteropoda	Snail.
		Pteropoda	Haliotis.
		Cephalopoda	Cuttle-fish.
Annulosa	Pseudhæmata.	Scolecida	Tape-worm.
		Echinodermata	Echinus.
		Gephyrea	Sipunculus.
		Annelida	Earth-worm.
	Arthropoda	Arachnida	Spider.
		Myriapoda	Centipede.
		Insecta	Fly.
		Crustacea	Lobster.
Vertebrata		Pisces	Salmon.
		Amphibia	Frog.
		Reptilia	Snake.
		Aves	Pigeon.
		Mammalia	Horse.

(i.) Bisexual animals. In the lower classes of animals the sexes are united in the same individual. Thus all the Protozoa, Cœlenterata, and certain classes, as Polyzoa, Ascidioida Brachiopoda, Scolecida, Echinodermata, Gephyrea, Annelida are bisexual. It is not to be expected in animals having both sexes in the same individual that secondary sexual characteristics should exist. Upon these animals Sexual Selection would not work. Yet it is to be kept in mind that many of these bisexual animals are beautifully colored. The corals, sea anemones, jelly-fish and star-fishes are all gay of hue, whilst it is evident that their colors cannot serve as a sexual attraction. Nor do they in all probability serve as a protection, though here we are not on ground so certain. We must regard the presence of bright colors in these bisexual beings as due to the chemical nature or minute structure of their tissues independently of any benefit thence derived. The great sub-kingdom Mollusca presents no secondary sexual characteristics. But this is not surprising when we remember that the majority of its members are sedentary beings, and do not seek one another for the act of reproduction. In a large number of cases impregnation of eggs takes place either by the discharge of eggs and of spermatozoa into the surrounding water, or by the discharge of the spermatozoa into that water, and their passage perhaps over a considerable distance into the female. Even in the highest class of Mollusca, that of the cuttle-fish or Cephalopoda, actual contact of the male and female seems rare. Therefore, as we have here a sub-kingdom of sedentary creatures, not seeking one another in act of courtship, and performing the act of reproduction in some cases even without the male and female being in the presence one of the other it is not remarkable that no secondary sexual characters are encountered in this sub-kingdom. The class Annelida does not present any sexual differences, but again this is not surprising for it is a class whose members are bisexual. But passing on to the highest divisions of the great sub-kingdom of ringed animals there we shall find in the Arachnida, Crustacea, and Insecta marked sexual differences. We do not meet with them again in the Myriapoda, but these again are bisexual.

(ii.) Unisexual animals. (*a*) Amongst the spiders we find males very brightly colored, whilst the females of the same

species are dull in hue, and in one genus, Theridon, the male has the power of making a stridulating sound by rubbing parts of its outer skeleton against other parts. The females have not that power.

(β) Considering the Crustacea, we find in the lower parasitic species males of small size with perfect swimming legs and good sense-organs, females larger and destitute of these organs. It would seem that here is arrangement in the male for discovering and seeking the female. The peculiar thread-like bodies, believed to be olfactory organs, are always much more numerous in the male than the female. The pincers or chelæ, whose most striking illustration is seen in the lobster, are larger in the male than the female, and probably serve in the combats for the possession of the female.

(γ) Secondary sexual characters in Insects. But it is in the insects especially amongst invertebrate animals, that the most striking differences between male and female are encountered and that Sexual Selection appears to have come most strongly into play.

In the huge class of Insecta the sexes differ at times in the structure of their motor organs, the wings and legs, in their sense organs, as in the colored or colorless antennæ of the male or female. But of course the chief interest is in structures that give one male an advantage over the other in the trial by force or the trial by song. The secondary sexual characteristics of importance to us will be those of organs enabling a particular male to conquer others in combat or in the more peaceful contest of song, or of beauty of color. Taking the various orders of Insecta in the succession in which they are considered by Darwin we shall find, in each, instances of secondary sexual characteristics.

Thysanura ($\theta\upsilon\sigma\alpha\nu\sigma\varsigma$ = fringe, $\sigma\upsilon\rho\alpha$ = tail). Example: Springtail. This order includes minute and very ordinary insects. The sexes do not differ, but the males undoubtedly pay court to the females.

Diptera ($\delta\iota\sigma$ = twice, $\pi\tau\epsilon\rho\alpha$ = wings). Example: Fly. But little difference between the sexes. The males, however, fight, and the gnats dancing up and down, backwards and forwards in the warm summer air are believed to be males courting the females.

Homoptera ($\acute{o}\mu o\iota o\varsigma$ = similar). Example: Cicada. The

females are mute, but the male cicada is one of the noisiest denizens of the tropical forest.

Orthoptera (ορθος = straight). Example: The Locust. The males of this order are remarkable for their musical power. The sounds to which they give rise can be heard at the distance of a mile.

Neuroptera (νευρον = a nerve.) Example: the Dragon-fly. Considerable diversity of color in both sexes, but the males, on the whole, are more highly colored.

Hymenoptera (ὑμην = god of marriage). Example: Bees and Wasps. Fights have been over and over again observed between males for the possession of some particular female. In the bees, where there is variation of color, the advantage is on the side of the male.

Coleoptera (κολεος = sheath.) Example: Beetles. The great horns rising from the head of the stag-beetle and other members of this order are peculiar to the male.

Lepidoptera (λεπις = scale). Example: Butterflies. Weak and fragile as are butterflies and moths the former at least are very pugnacious. The wonderful arrangement of colors on the wings of members of this order appears to have intimate relation to Sexual Selection. When the sexes do differ it is the male that is the more beautiful, in almost all cases. In a few instances the females are colored the more splendidly. With the moths or night-fliers, that are busy at a time when color would not be perceived, there is, as far as has been observed, no difference in the color of the two sexes. We must remember that where the female is, as in certain cases, bright and variegated of hue, two explanations are possible; the one that the colors have been acquired for protection, the other, that the male having first acquired them through the agency of Sexual Selection, they have, after a long time, been transmitted to both sexes. Of course, neither of these explanations covers the very rare cases where the female is brightly colored and the male of dull hue. Two other points remain for consideration. Mimicry, as Mr. Bates first pointed out, is frequent amongst this order of insects. Certain butterflies in South America resemble the Heliconidæ in every strip of shade and color. Now the Heliconidæ, though beautifully marked insects, are protected from the attacks of birds.

"Mr. Bates referring to the discussion which had taken

place at the previous meeting respecting mimetic resemblances, introduced Mr. T. Belt, the gentleman who had favored him with many of the facts as to the aversion of insectivorous birds to the Heliconidæ. . . . Mr. Belt gave a detailed narration of his observations on this subject, and stated that not only were the perfect insects of Heliconidæ protected by their unpleasant odor, but that the larvæ also were rejected by fowls. . . . Mr. Bates said that one group of Heliconidæ was furnished at the apex of the abdomen with a process from which, when the abdomen was pressed, a very disagreeable odor was exhaled, but he had never seen any fluid ejected."—(Proc. Ent. Soc., Dec. 3, 1866, p. 45).

The butterflies that mimic these protected species have in this case acquired their color because their ancestors have been mistaken by the birds for Heliconidæ and not eaten. And, lastly, it must not be forgotten that insects in the larva condition or caterpillar stage, are often beautifully colored. The colors stand in no definite relationship to those of the mature insect, nor do they serve in any way as a protection. Mr. Wallace suggests that these conspicuously-colored caterpillars have a disagreeable taste, "but as their skin is extremely tender, and as their intestines readily protrude from a wound, a slight peck from the beak of a bird would be as fatal to them as if they had been devoured." Hence, as Mr. Wallace remarks, 'distastefulness alone would be insufficient to protect a caterpillar unless some outward sign indicated to its would-be destroyer that its prey was a disgusting morsel.'

(δ) Pisces or fishes. Turning now to the vertebrate classes, we shall find yet other cases of the males possessing characters with which the females are not endowed—characters that would seem to be the result of continued Sexual Selection. Observation has shown that fishes, in spite of the method of impregnation of the ova after they have left the body of the female, nevertheless court and fight. The stickleback is a polygamist. The males are bold and pugnacious; the females are placid creatures. The male salmon and the male trout are both fighting animals, and during the breeding season the former has developed upon its lower jaw the curious straight projection which serves to strengthen and protect the jaws when one male charges against another. Where color difference obtains the advantage is again on the

side of the male. A strange fish inhabiting the fresh waters of South America has in the male sex its mouth fringed with a complete beard of soft hairs. The blennies during the breeding season become much more brightly colored, and have a crest developed upon the head. The change of color and the development of the crest are confined to the males. The salmon, the bull-trout, the char, the pike, and the stickleback are a few of the many cases where special development of color occurs in the male during the breeding season. And, finally, certain fishes are known to make peculiar noises that in some cases are described as musical. The Umbrina can be heard giving out its peculiar drumming sound at a depth of twenty fathoms, and the fishermen of Rochelle say that the males alone make the noise during the spawning time.

(ε) Amphibia. Two principal orders of Amphibia are known: the Urodela (*ουρα* = tail, *δηλος* = evident), examples, the Salamander and the Newt, and the Anura (*α* = without, *ουρα* = tail), examples, the Frog and the Toad. In both orders there is difference of color between the male and the female, though in the latter order the difference is of intensity rather than of hue. But in the frog we have a striking male secondary sexual character in its vocal apparatus. The croaking that makes night hideous in the vicinity of a country pond in the summer time is mainly due to the male frogs whose vocal organs are much the more highly developed.

(ζ) Reptilia. Of the four orders into which the class Reptiles is divided the lowest is the Ophidia (*οφις* = snake) or snakes. The difference between the male and the female in color is, as in the frogs, a difference of intensity and the more highly pronounced tints are on the male. During the breeding season the scent glands near the posterior end of the body are especially active. The second order Lacertilia (lacerta = a lizard), or lizards, includes many pugnacious species whose male members fight during the spring or early part of the summer whenever they meet. The contest usually continues until the tail of one of the combatants disappears from his own body and enters into that of his victor. Crests, pouches, appendages on the snouts and horns are met with in the males of lizards, that are absent in the corresponding females. The tortoise and

turtles of the order Chelonia (χελος = tortoise) present but little sexual difference, though the huge tortoise of the Galapagos island referred to in the "Naturalist's Voyage round the World" has a voice, or rather a hoarse bellow. And this hoarse bellowing noise, audible at a distance of more than a hundred yards, is possessed by the male only and during the pairing season only. The Crocodilia are certainly combative at the breeding time and from the glands close to their jaws a notable odor is emitted at that period.

(η) Aves or birds. It is in this class that the most marked and most diversified secondary sexual characters appear. We may arrange the facts in regard to birds under four heads—their fighting, their music, their ornament, and their exertion of choice plumage of adults and young.

1. Their fighting. When Dr. Watts wrote "Birds in their little nests agree" he showed himself to have been no observer of nature. Birds in their little nests do not agree. Almost all male birds are exceedingly pugnacious, fighting with beaks, and wings, and legs. Individuals of this sex are in many cases larger and more powerful than the females, and, especially amongst the polygamous birds, are furnished with special weapons such as the spurs of the game-cock. Even the peacock will engage in fierce contest, though its more usual rivalry is that of display.

2. Their music. When in the spring evenings the rich flood of varied song in woods and country lanes is charming the day to sleep, not all of us that are witched with the exquisite harmonies and melodies remember that the birds are contending with each other. There is intense rivalry between the males in their singing. In these cases of singing birds the muscles of the larynx of the male are stronger than in the opposite sex. The singing birds are usually small and not brightly colored, and this might be expected, for the large birds fight for the possession of the female and again those that are brightly colored will contend for the female in display, but the birds that are neither powerful nor beautiful will enter into contest of song.

3. Their ornament. Combs, wattles, colors, plumes of feathers, horns, top-knots, are but a few of the different structures encountered in birds that are clearly for a decoration to them. Even the very iris of the eye is at times more

brightly colored in the male than in the female. It is impossible to look at the difference between the magnificent decoration of the peacock and the simplicity of the pea-hen, or at the winter ornamentation of the male bird of paradise and the obscure coloring and absence of ornament of the female, or, indeed, it is impossible even if we consider the innumerable cases less conspicuous than these where the male birds are provided with color and the female destitute thereof, without feeling assured that in the past the males possessing such color have been steadily selected by the females generation after generation, and that the present high coloring is the result of Sexual Selection. It would seem that the birds take a personal delight in displaying their beauty. Contrast the behavior of the peacock with that of the polyplectron. "When the peacock displays himself, he expands and erects his tail transversely to his body, for he stands in front of the female, and has to show off, at the same time, his rich blue throat and breast. But the breast of the polyplectron is obscurely colored, and the ocelli are not confined to the tail-feathers. Consequently the polyplectron does not stand in front of the female; but he erects and expands his tail-feathers a little obliquely, lowering the expanded wing on the same side, and raising that on the opposite side. In this attitude the ocelli over the whole body are exposed before the eyes of the admiring female in one grand bespangled expanse. To which ever side she may turn, the expanded wings and the obliquely-held tail are turned towards her."

Where the amount of ornamentation in birds is but little, they make the most of it. It is the prettiest sight to see a bullfinch pushing out his breast as he moves before the female, and exhibiting as many of his crimson feathers at once as possible. That the males show themselves off to the greatest advantage within their power is known to all observers of birds. One of the beautiful bronze-winged pigeons of Australia, according to Mr. Weir, acts as follows:— "The male, whilst standing before the female, lowers his head almost to the ground, spreads out and raises perpendicularly his tail, and half expands his wings. He then alternately and slowly raises and depresses his body, so that the irridescent metallic feathers are all seen at once, and glitter in the sun."

The strong influence of Sexual Selection comes out all the more prominently when it is remembered that many of the characters which render the male conspicuous and of excellent beauty in the eyes of the female are of disadvantage in other ways. Thus not a few of the ornaments acquired by birds have been acquired at the expense of lessened powers of flight or of running, and the bright colors and gorgeous feathers that are attractive to the female may serve as a guide to the animals preying upon the possessors of them.

4. The exertion of choice by the female birds. This is an important question. If the females do not exert choice and prefer certain males, the whole fabric of Sexual Selection falls to the ground. The evidence in favor of the exertion of such choice is as follows. 1st. The length of courtship. The long time during which both sexes of certain birds meet at particular places, day after day, will depend, at least partially, on the act of courtship being of some duration. In Germany and Scandinavia such meeting of the black cocks lasts from the middle of March, through April, to May. 2nd. Unpaired birds. There is evidence that some males and some females of the same species, living in the same places, do not please each other, and, as a consequence, do not pair. In many cases, where the female of a pair of birds dies suddenly, her place is instantly filled by another female. Thus with the magpies and partridges the birds are never seen in the spring-time alone. There are always many males and females ready to repair the loss of a mated bird. It is to be observed that there are both males and females thus ready. Why have not these, that we may call spare birds, paired. It is possible for us to believe, following Mr. Weir, that as the act of courtship is a prolonged affair, it may happen that these particular males and females have not succeeded in pleasing each other, and have not paired. 3rd. Mental qualities of birds. The exertion of a choice on the part of a female implies a certain amount of intelligence. It is necessary to remind the reader that the mental qualities of birds are by no means of a low order. Affection for one another, recognition of people, benevolence towards injured members of their tribe, sympathy with pleasure, acute powers of observation—all are possessed by these animals. We may argue that some sense of beauty,

at least, is also theirs, if it were only from the fact that certain humming-birds ornament the outside of their nests, and that the bower-birds of Australia build the most remarkable structures, decorated with feathers, shells, bones, and leaves. 4th. Distinct cases of preference of particular males by females are on record. Audubon, the naturalist of the forests of the United States, is sure that the female deliberately chooses her mate. Female pigeons have been known to show strong antipathy towards certain males without any assignable reason. The female widow bird of the Cape of Good Hope will have nothing to do with a male destitute of the long ornamental tail-feathers that are his great attraction to her.

5th. Variability in birds. Another essential, if Sexual Selection is to be of any avail in modifying the characteristics of animals, is the variability of animals, and especially the variability of their secondary sexual characteristics. Such variability exists in birds. Slight individual differences of color or of the shapes of parts in relation to the secondary sexual characteristics are the most important for the work of selection, and the evidence is strong that such individual variations are more apt to occur in the males than in the females. Besides the variability of secondary sexual characteristics, it is necessary to establish their gradations the one into the other, and of these there are countless instances. Take but the one case that is dealt with at length by Darwin, the formation of the ocelli, or eye-like spots on the plumage of birds. An ocellus is essentially a spot of color within a ring of another color. Let us go back to the butterflies for a moment. Our common meadow-brown butterfly has almost numberless gradations from a simple minute black spot to an elegantly-shaded ocellus. In a South African butterfly there are gradations from exceedingly small white dots encircled by a scarcely visible black line to perfectly symmetrical and large ocelli. In birds it is possible to observe the formation of these circular spots from the breaking up and contraction of stripes of color. Even the peacock, with its magnificence of feathering and of color, can be connected with ordinary birds by a series of intermediate forms. "Thus the several species of Polyplectron manifestly make a graduated approach in the length of their tail-coverts, in

the zoning of the ocelli, and in some other characters, to the peacock."

5. Plumage in relation to age and sex. The last point to be considered in dealing with the class of birds is the transmission of characters as limited by age in reference to Sexual Selection. The reader will bear in mind two or three principles of inheritance. The tendency to inheritance of particular characters at corresponding ages in different individuals. The transmission of a character appearing late in life in one sex to that sex alone. The transmission of a character appearing early in life to both sexes. Comparing the plumage of males and females in the adult condition with that of the young there are six classes of cases encountered in Aves. These six will be enumerated, exemplified, and in the explanation as given by Charles Darwin will be repeated.

MALE.	FEMALE.	YOUNG.	EXAMPLE.
1st.—More conspicuous.	Less conspicuous..	Like the female ...	Duck.
2nd.—Less conspicuous..	More conspicuous.	Like male	Cassowary.
3rd.—Like female... ...	Like male	Special plumage...	Robin.
4th.—Like female ...	Like male	Like adults	Kingfisher.
5th.—Distinct winter and summer plumage	Same	Like adult winter plumage	Indian Eglet.
		Like adult summer plumage	Razor-bill.
		Like the females only	American Goldfinch.
		Intermediate between males and females	Many wood birds.
		Different from males and females	Heron.
6th.—Unlike female ...	Unlike male... ...	Males like adult males ... ... / Females like adult females	Black-cap.

Class 1st. Explanation. The most probable view seems that variations in color or in other ornament have occurred in the males late in life, and have only been transmitted to the males.

Class 2nd. Explanation. Probably the females have been the more numerous, and have been the active animals in the courtship, whilst the males have been the courted ones.

Class 3rd. Explanation. The colors have been acquired

through Sexual Selection by the male late in life, and through transmission have been limited to the same age (for the young do not possess the colors) but have not been limited to the same sex for the females do possess them.

Class 4th. Explanation. Three explanations are possible. That the male varied when mature, and transmitted his variations to both females and young. That he varied when young and transmitted his variation to both females and young. He may have varied when adult and transmitted his plumage to both adult sexes, and later by a failure of the first law of inheritance transmitted it also to his young.

Class 5th. Explanation. An exceedingly complex class. Three distinct elements are concerned; sex, age, and the season of the year. When the young resemble the female in her summer dress or the adults of both sexes in their winter dress the cases differ little from those under class 1st and class 3rd. The only difference is the limitation of transmission to the breeding season. But when the young differ in their plumage from either the summer or the winter plumage of the adult the case is more difficult. Perhaps the young have retained an ancient state of plumage, or perhaps the winter plumage of the adult is the most ancient condition.

Class 6th. Explanation. Probably the males in this class differing from those included in the first have transmitted their colors to their male offspring at an earlier age than that at which they themselves acquired them. In all cases where color is under consideration we must not forget that protection may come into play, especially in relation to the females. Ground birds are so colored as to imitate the ground; birds haunting reeds and sedges are obscure in hue; sea birds are often green.

(θ)—Secondary Sexual characteristics in Mammals.

Mammals generally. Turning to the highest class Mammalia of the highest sub-kingdom Vertebrata, we shall consider their weapons, their voice, odor, color, and the evidence of the choice exerted by the females.

1. Weapons. With Mammals battle decides who is to be the possessor of the female much more frequently than charm display. The teeth of such creatures as the Narwhal, the spur on the leg of the Ornithorhyncus, the horns of the

Deer tribe are illustrations of weapons much better developed in the male, and used by him in his contests for the female. Usually only one form of weapon is possessed, though the male Muntjac Deer has both horns and prominent canine teeth. The mane of the Lion is probably connected with its warfare as it forms a good defence against the attack of its rival.

2. Voice. Almost all male Mammals use their voices much more at the breeding season than at other periods. The nose of the male Sea Elephant during that time is exceedingly elongated, even to the length of a foot, and its voice, probably strengthened by this nasal extension, is wild, and hoarse, and gurgling. The female Sea Elephant never has the nose extension, and her voice is largely different. The male gorilla again has a voice of tremendous power, and he possesses a resonant, song-increasing sac in connexion with his larynx not possessed by the opposite sex.

3. Odor. The odors of many animals, disagreeable as they are to the human olfactory sense, are in several cases at least connected with the reproductive function. Of course no reference is here made to those odors which would appear to be means of defence, but odoriferous glands in many other cases are especially developed in the males and especially during the breeding time, and in some species the odoriferous glands are confined to the males. Probably the odor emitted serves to excite or allure the female.

4. Color. There are several cases of male quadrupeds that differ in color from the female. The great red male kangaroo strikingly contrasts with the female with its delicate blue tints. The African squirrels present much brighter coloration in the male animals. So it is with certain bats and with the *Mus minutus* of Russia. Very marked sexual difference of color obtains in the seals, and very common is the sexual difference amongst all ruminants. In the order Primates we find the male of the lemur coal black, the female reddish yellow. The male mandril has its face blue, with the ridge and tip of the nose red; white stripes shaded with black in many cases traverse the blue; on the forehead is a crest of hair, on the chin a yellow beard; and these are but a few cases taken from the order Primates of difference in color between the male and female, where striking coloration belongs to the former.

5. Choice. There seems to be little doubt that the Mammals, like the birds, exercise a choice in pairing, and that this choice is exerted by the females. Mr. Mayhew, who has studied dogs with exceeding care, is convinced that females are strongly attracted by males of large size. Mr. Blenkiron, the greatest breeder of racehorses in the world, shows that those animals are capricious in their choice. Similar statements are made with respect to bulls, to the reindeer, to pigs; and hence we may infer that individual antipathies and preferences do exist, and that they are usually shown by the female.

CHAPTER L.

(*c*) *Secondary Sexual Characteristics of Man.*

THROUGHOUT the human race man is generally taller, heavier, stronger than woman. The body, and especially the features are more hairy, and the voice more powerful. It will be noticed that these differences between man and woman are exactly the same as the differences between the male and female apes. Probably in the earlier times Sexual Selection came largely into play by women choosing the strongest and tallest men. With barbarous nations it is not to be expected that the choice should be at first of the intellectual or artistic man. When brute force is all in all, bodily strength would be the main attraction to the female, and therefore the law of battle would be with those barbarous races the decider as to what men would breed and transmit their qualities to their descendants. With barbarous nations, as for example, the Australian, women are a constant cause of war between individuals of the same tribe and between members of different tribes, and in the earlier races also, when artificial advantages or attractions are added to the natural ones, at first these are especially employed by the male. The ornaments that adorn the bodies of the savage races are at first confined to the male members thereof. We may admit then that Sexual Selection will have considerable action in the early time, though its action would be opposed by certain practices which are prevalent in that early time. These would be communal marriages or promiscuous intercourse, infanticide, early betrothals and the low esteem in which women are held by savages. All these would certainly interfere with the action of Sexual Selection to some extent. But it must not be supposed that with savages women are in quite so abject a state in relation to marriage as has often been stated. The evidence of Mr. Winwood Reade in respect to the negroes

of Western Africa, that of Williams in respect to the Fiji Islanders, of Shooter as regards the Caffres, and of Birchell as to the Bushmen, all show that a very considerable amount of choice is exercised by women, even of the very lowest tribes. Hence we are entitled to believe that as the males of the human race differed in certain secondary sexual characteristics from the females, having greater strength, more powerful voice, larger development of hair covering, being in many cases more highly ornamented, and as the females, even of the most savage races, exercise choice in the selection of their mates, by degrees as the males possessing certain qualifications were persistently selected, and males not possessing those qualifications rejected, the race descending from such unions would show more and more of those qualifications. At first the qualities to be admired by the woman in the man would be of a low order. They would be in the main brute force. Hence, the physique of the race would steadily improve, the weaker males not producing offspring. But as time rolled on, other variations than those of mere bodily size and strength and color and hairiness, would appear. As the brain evolved towards more complex structure and more complex function, variations of mental characteristics would be noticeable, and by degrees the females would begin to exercise choice between the men differing in mental characteristics one from another. Bodily differences would not lose altogether their sway. Very righteously, even to-day, beauty of form and face attract. But bodily differences would no longer be the sole determining causes of selection. The advancing woman would consider not alone face and physique, but mental and moral character. The artistic nature of those from whom selection was to be made would be considered, and hence to-day the question becomes a far more complex one, and the results far more momentous than in the dim past. To-day, woman has to consider beauty of face, beauty of form, social position, strength of mind, strength of moral character. She has to make her choice between men differing in infinite degrees in all particulars, and she has to make that choice conscious that her selection will influence not alone her life and his, but the lives which will spring from them. When all men and all women are striving after the possession in themselves of the healthiest, purest body, and the healthiest, purest

mind, and when each man and woman in the search for the partner that is to make existence life, seeks after one that possesses both body and mind of the highest possible order, then will spring "the crowning race of human kind."