Punkerslut
Evolution: Origins of Life
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Retrieved on 22nd April 2021 from www.anarchistrevolt.com
Edition 1.1

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appendix and the male nipple, which serve no purpose. In manatees, there are nails on the tip of their fins, and the ostrich is born with wings yet incapable of flight. With reversionary and vestigial organs, we find the great deal of these useless tissues are remnants of earlier creatures, which lead us finally to believe that it is true, that humans ascended from lower organisms, through the means of Natural Selection.

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Chapter 8: Conclusion

The theory of Evolution, that mankind today has come into existence through many successive variations of older organisms, is a scientific theory, based on evidence and observation. There is no doubt to the principles of inheritance and variation, that offspring will often times resemble their parents in a great deal of points, but differ in some other points. Experience and experiments have confirmed this. There is also little doubt that organisms of the world today are adapted well to their environments. No naturalist is yet to dispute this. Finally, we have the theory of Natural Selection, a very sound idea on how adaptations occur. Those organisms that are fit to their environment survive and reproduce, while the unfit do not survive or reproduce. These few facts alone gave life to the idea that mankind came from lower beings, yet ever since this suspicion, there has been a wealth of evidence accumulated in favor of it. First, we have our own process of Evolution, Selective Breeding, through which we used the laws of Natural Selection to create vast amounts of new species and races. Second, we have the similarities between the different species of this planet. Baboons are similarly affected by alcohol as we are, and those diseases which effect humans also effect lower creatures, and, finally, the healing of damaged tissue is incredibly similar in man as it is in lower animals. Third, we find a great deal of reversionary organs, or development of tissue that is useless to the current form. For instance, there is the possibility that a male mammal's nipples are capable of producing milk, and it is possible for humans to be born with a tail. Fourth, the existence of vestigial organs, which serve no purpose, are among all higher creatures. In humans, we have the

drive away flies; yet we should pause before being too positive even in this case, for we know that the distribution and existence of cattle and other animals in South America absolutely depend on their power of resisting the attacks of insects: so that individuals which could by any means defend themselves from these small enemies, would be able to range into new pastures and thus gain a great advantage. It is not that the larger quadrupeds are actually destroyed (except in some rare cases) by flies, but they are incessantly harassed and their strength reduced, so that they are more subject to disease, or not so well enabled in a coming dearth to search for food, or to escape from beasts of prey.[10]

[10] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 6.

Chapter 1: Inheritance, Variation, Adaptation, and Natural Selection

> WHEN on board H.M.S. Beagle as naturalist, I was much struck with certain facts in the distribution of the organic beings inhabiting South America, and in the geological relations of the present to the past inhabitants of that continent. These facts, as will be seen in the latter chapters of this volume, seemed to throw some light on the origin of species- that mystery of mysteries, as it has been called by one of our greatest philosophers. On my return home, it occurred to me, in 1837, that something might perhaps be made out on this question by patiently accumulating and reflecting on all sorts of facts which could possibly have any bearing on it. After five years' work I allowed myself to speculate on the subject, and drew up some short notes; these I enlarged in 1844 into a sketch of the conclusions, which then seemed to me probable: from that period to the present day I have steadily pursued the same object. I hope that I may be excused for entering on these personal details, as I give them to show that I have not been hasty in coming to a decision.
>
> – Charles Darwin[1]

[1] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, introduction.

> Mr. Darwin, who, I may tell you, has taken very great pains and spent much valuable time and attention on the investigation of these variations, and getting together all the facts that bear upon them.
>
> – Thomas Henry Huxley[2]

Section I: Inheritance and Variation

The two principles I wish to begin with are those which are least doubted, by both experience and science. By inheritance, or heredity, it should be understood that I am speaking of the occurrence when offspring resemble to a great degree their parents. To quote Charles Darwin, "No breeder doubts how strong is the tendency to inheritance; that like produces like is his fundamental belief: doubts have been thrown on this principle only by theoretical writers."[3] By variation, or diversity (or, sometimes even, "mutations"), by this it should be understood that I am speaking of the changes that occur between offspring and parents, that sometimes a child will resemble in all degrees their parents except for some small, almost unnoticeable parts. Again, to quote Charles Darwin, "No one supposes that all the individuals of the same species are cast in the same actual mould."[4]

It may almost seem that these principles are in direct adversity to each other. The first concludes that children will be similar to their parents yet the second concludes that children will differ from their parents. To explain what may almost appear as a contradiction, the fact is that organisms will resemble their parents to a degree and they differ from their parents in a degree. Some will greatly resemble their progenitors whereas others will look almost mon-

[2] "The Perpetuation of Living Beings, Hereditary Transmission and Variation," by Thomas Henry Huxley.

[3] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 1.

[4] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 2.

bodies. When removed, there is nothing particularly extraordinary about it. There are also vestigial muscles. By what writ can anyone claim that they are beautiful? They are attached to the os coccyx, and in instances of reversion, sometimes in the back of the neck or other random parts, but how might they incite beauty? Simply put, this argument that vestigial organs are created for beauty is ignorant.[8]

Also, there is the question of why a bee has evolved in the way that it is — that the proper usage of its sting will actually kill the creature. If organisms evolve and change through Natural Selection so that they can survive and reproduce, why is it that the mechanisms of the bee lead it to suicide? However, in this case, we see that Natural Selection has risen to an more advanced form. Those bee colonies that did not have suicidal stingers, for instance, perished, because none were capable of fending off invaders. Yet, those bee colonies that had suicidal stingers, and successfully fended off invaders, did survive, and were capable of reproducing. So we see here, Natural Selection is not a system of survival simply with one organism versus another organism, but it can be raised even higher, to one society versus another society. In human terms, this is also observable: humans are kindly and even charitable to one another in some instances, without personal gain.[9] Finally, there is one real argument against Evolution and Natural Selection that stands: how is it that such small advantages in an organism be so important to its survival? On that question, I will end with a quote by the father of Natural Selection…

> The tail of the giraffe looks like an artificially constructed fly-flapper; and it seems at first incredible that this could have been adapted for its present purpose by successive slight modifications, each better and better fitted, for so trifling an object as to

[8] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 6.

[9] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 6.

> these intermediate varieties will, from reasons already assigned (namely from what we know of the actual distribution of closely allied or representative species, and likewise of acknowledged varieties), exist in the intermediate zones in lesser numbers than the varieties which they tend to connect. From this cause alone the intermediate varieties will be liable to accidental extermination; and during the process of further modification through natural selection, they will almost certainly be beaten and supplanted by the forms which they connect; for these from existing in greater numbers will, in the aggregate, present more varieties, and thus be further improved through natural selection and gain further advantages.
>
> [...] [...]
>
> When we see any structure highly perfected for any particular habit, as the wings of a bird for flight, we should bear in mind that animals displaying early transitional grades of the structure will seldom have survived to the present day, for they will have been supplanted by their successors, which were gradually rendered more perfect through natural selection.[7]

Some will claim that nature's so-called "vestigial organs" are not vestigial at all, but rather are created for the beauty of mankind. The first point I will respond to this argument is the question of beauty. Even in different nations of mankind, the definition of "beautiful" and "ugly" varies greatly, ignoring altogether that one person's concept of these ideas may vary greatly from another, even if the two are related. In regard to the appendix of the human, how is it that it may inspire beauty? For millions of years, it had not been observed, and even today it is embedded inside our

[7] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 6.

strous comparably. As far as proving the truth of inheritance and variation, simple experience would seem to prove it quite easily. For instance, when two members of the same human race decide to have a child, it will be of their race, just as when two people who are tall have a child, their child will also tend to be tall. Yet these are very vague and simple correlations between adults and children. Anyone who has a family will easily be able to conclude that children resemble their parents in great degrees, in facial features, in physical strengths and weaknesses, in body frame, and in other manners. Also, too, no parent will be ably to deny the principle of variation any more than they can deny the principle of inheritance. Those who have children will no doubt see that there is some variation, some degree of difference between them. That there are some attributes held in their child, which neither parent had, is undeniable.

Though it is quite true that simple experience alone would be enough to sustain belief in both inheritance and variation, I would still like to draw some scientific examples. There was one instance where a man could use the muscles in his scalp to move heavy objects, and even move a set of heavy books. A distant cousin of this man had moved to France, where he was contacted and asked if he possessed the same ability — and indeed, he did.[5] It has been proven that genius, as well as insanity and deteriorated mental abilities, often times will run in a family.[6] For many recreational drugs, which at some times are believed to induce psychological trauma, it is suggested that they should be avoided if there is any family history of schizophrenia or other mental illness.[7] The ability to produce twins has also been associated with certain families.[8]

[5] The Descent of Man, by Charles Darwin, 1871, chapter 1.

[6] Hereditary Genius: an Inquiry into its Laws and Consequences, 1869.

[7] Section 6 of the DXM FAQ, by William White.

[8] Mr. Sedgwick, British and Foreign Medico-Chirurgical Review, July, 1863, p. 170.

In regards to variation, there is a type of plant known as "Sporting Plants," which under domestication, are very likely to produce a widely different character in their descendants[9] To quote Charles Darwin, "At long intervals of time, out of millions of individuals reared in the same country and fed on nearly the same food, deviations of structure so strongly pronounced as to deserve to be called monstrosities arise."[10] When animals have been observed to breed in captivity (which is a rarity in itself), it has been noticed that the offspring are somewhat unlike their parents.[11] The scientist, Mr. Walsh, when examining insects, found that insects of the same species often produce secretions, which differ in color, size and nature.[12] Though somewhat more a piece of evidence from experience, it has been observed, as Darwin wrote, "No two individuals of the same race are quite alike. We may compare millions of faces, and each will be distinct."[13] In an investigation of the military, it was found that it was an extremely rare instance to find two soldiers with legs that had identical lengths.[14] Though there are certain trends in how the human skull is developed, some more rounded and others more elongated, Naturalists have confirmed that skulls from the members of the same race will often differ with great variation, even when comparing the skulls of inhabitants of a confined area, such as the Sandwich Islands.[15] It has been observed that the chief arteries that run through the body differ immensely

[9] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 1.

[10] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 1.

[11] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 1.

[12] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 2.

[13] The Descent of Man, by Charles Darwin, 1871, chapter 2.

[14] Investigations in the Military and Anthropological Statistics of American Soldiers, by B. A. Gould, 1869, p. 256.

[15] With respect to the " Cranial forms of the American aborigines," see Dr. Aitken Meigs in Proc. Acad. Nat. Sci. Philadelphia, May, 1868. On the Australians, see Huxley, in Lyell's Antiquity of Man, 1863, p. 87. On the Sandwich Islanders, Prof. J. Wyman, Observations on Crania, Boston, 1868, p. 18.

forms, for these will be more slowly modified and improved. It is the same principle which, as I believe, accounts for the common species in each country, as shown in the second chapter, presenting on an average a greater number of well-marked varieties than do the rarer species.

[...]

To sum up, I believe that species come to be tolerably well-defined objects, and do not at any one period present an inextricable chaos of varying and intermediate links; first, because new varieties are very slowly formed, for variation is a slow process, and natural selection can do nothing until favourable individual differences or variations occur, and until a place in the natural polity of the country can be better filled by some modification of some one or more of its inhabitants. And such new places will depend on slow changes of climate, or on the occasional immigration of new inhabitants, and, probably, in a still more important degree, on some of the old inhabitants becoming slowly modified, with the new forms thus produced, and the old ones acting and reacting on each other. So that, in any one region and at any one time, we ought to see only a few species presenting slight modifications of structure in some degree permanent; and this assuredly we do see.

[...]

...when two or more varieties have been formed in different portions of a strictly continuous area, intermediate varieties will, it is probable, at first have been formed in the intermediate zones, but they will generally have had a short duration. For

methods from each other, whereas the construction of the tissue around the os coccyx of the human is similar to that of the tails on other tailed creatures.[6] What, though, may be said of the absence or rarity of transitional forms, or linking organisms, such as the one which links mankind to primates? Quoting Darwin…

> The intermediate variety, consequently, will exist in lesser numbers from inhabiting a narrow and lesser area; and practically, as far as I can make out, this rule holds good with varieties in a state of nature. I have met with striking instances of the rule in the case of varieties intermediate between well-marked varieties in the genus Balanus. And it would appear from information given me by Mr. Watson, Dr. Asa Gray, and Mr. Wollaston, that generally, when varieties intermediate between two other forms occur, they are much rarer numerically than the forms which they connect. Now, if we may trust these facts and inferences, and conclude that varieties linking two other varieties together generally have existed in lesser numbers than the forms which they connect, then we can understand why intermediate varieties should not endure for very long periods:- why, as a general rule, they should be exterminated and disappear, sooner than the forms which they originally linked together.
>
> […]
>
> For forms existing in larger numbers will have a better chance, within any given period, of presenting further favourable variations for natural selection to seize on, than will the rarer forms which exist in lesser numbers. Hence, the more common forms, in the race for life, will tend to beat and supplant the less common

[6] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 6.

from individual to individual.[16] Teeth are so varied from individual to individual, that they have often been used as a means of identification.[17] It is well known that the feet muscles are not the same in any two out of fifty humans.[18] The !Kung of Kalahari, a tribe of aboriginals sometimes referred to as "Bushmen," are known to be able to identify individual members of game by their tracks. If a hunter loses the track of his prey, and finds more tracks, they will be able to identify that it is their prey and not another animal. So, too, a child in this tribe can identify their mother's footprints specifically, even when there are numerous prints of other person's around. To these tribesmen, every footprint is identical when compared with the footprints of others.[19] In thirty six individuals, there were 295 variations in muscles when compared to standard biology textbooks, and in another set of individuals, there were 558 variations. A single body presented 25 distinct abnormalities.[20] Professor Macalister describes no less than twenty distinct variations in the muscle known as palmaris accesorius.[21] The famous anatomist Wolff insists that variation of the liver, kidneys, and lungs of the human are great.[22] The naturalist Brehme has observed that in his tamed monkeys of Africa, no two are alike in disposition and temper, and this is partly innate and partly the result of the manner in which they were educated.[23] The muscles of our hands and feet,

[16] Anatomy of the Arteries, by R. Quain. Preface, vol. i., 1844.

[17] *Collier's Encyclopedia*, Lauren S. Bahr (editorial director) and Bernard Johnston (editor in chief), volume 12, page 491.

[18] The Descent of Man, by Charles Darwin, 1871, chapter 2.

[19] "The Desert" by Elizabeth Marshall Thomas (Continuation), from the book The Harmless People by Elizabeth Marshall Thomas. Appearing in the OneWorld Magazine.

[20] Proceedings Royal Society, 1867, p. 544; also 1868, pp. 483, 524. There is a previous paper, 1866, p. 229.

[21] Proc. R. Irish Academy, vol. x., 1868, p. 141.

[22] Act. Acad. St. Petersburg, 1778, part ii., p. 217.

[23] Brehm, Illustriertes Thierleben, B. i., ss. 58, 87. Rengger, Saugethiere von Paraguay, s. 57.

like those of other primates and lower animals, are highly apt to variation.[24]

In the late 1700's, Thomas Malthus wrote, "It is probable that no two grains of wheat are exactly alike."[25] In the same era as Charles Darwin, Thomas Henry Huxley wrote, "...the sexual process, then we find variation a perfectly constant occurrence, to a certain extent..."[26] This premise of variation in reproduction seemed, considerably, to be a very simple and acceptable observation of scientists as much as laymen. Huxley also wrote, "The tendency to reproduce the original stock has, as it were, its limits, and side by side with it there is a tendency to vary in certain directions, as if there were two opposing powers working upon the organic being, one tending to take it in a straight line, and the other tending to make it diverge from that straight line, first to one side and then to the other."[27] Finally, I shall here quote an excerpt from Huxley where he describes the genealogy of one human being who was born with six fingers. He writes...

> Reaumur, a famous French naturalist, a great many years ago, in an essay which he wrote upon the art of hatching chickens,–which was indeed a very curious essay,–had occasion to speak of variations and monstrosities. One very remarkable case had come under his notice of a variation in the form of a human member, in the person of a Maltese, of the name of Gratio

[24] Messrs. Murie and Mivart in their "Anatomy of the Lemuroidea" (Transact. Zoolog. Soc., vol. vii., 1869, pp. 96–98) say, " some muscles are so irregular in their distribution that they cannot be well classed in any of the above groups." These muscles differ even on the opposite sides of the same individual.

[25] "An Essay on the Principle of Population," by Thomas Malthus, Chapter 19, 1798.

[26] "The Perpetuation of Living Beings, Hereditary Transmission and Variation," by Thomas Henry Huxley.

[27] "The Perpetuation of Living Beings, Hereditary Transmission and Variation," by Thomas Henry Huxley.

> or the survival of the fittest, always intently watching each slight alteration in the transparent layers; and carefully preserving each which, under varied circumstances, in any way or in any degree, tends to produce a distincter image. We must suppose each new state of the instrument to be multiplied by the million; each to be preserved until a better one is produced, and then the old ones to be all destroyed. In living bodies, variation will cause the slight alterations, generation will multiply them almost infinitely, and natural selection will pick out with unerring skill each improvement. Let this process go on for millions of years; and during each year on millions of individuals of many kinds; and may we not believe that a living optical instrument might thus be formed as superior to one of glass, as the works of the Creator are to those of man?[5]

The theory of Evolution is greatly supported from the method by which naturalists organize life, into different kingdoms, then phylums, then different orders, families, species, and races, until we are capable of distinguishing the amount of difference between different organisms. We notice, however, that there are some creatures of completely different phylums or kingdoms, and yet they have developed similar organs. For instance, the electric eel is capable of producing electricity, much like the sting ray has a mechanism for producing a small amount of electricity. Organisms of extreme distance in relation will inevitably produce organs which suffice to the same function as each other. The case is analogous to two inventors in different countries, working on the same invention to solve the same problem. But like the inventors, the organs which resemble each other in different organisms, though they serve the same purpose, they are intrinsically built in completely different

[5] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 6.

tute of any other apparatus. In fishes and reptiles, as Owen has remarked, "the range of gradations of dioptric structures is very great." It is a significant fact that even in man, according to the high authority of Virchow, the beautiful crystalline lens is formed in the embryo by an accumulation of epidermic cells, lying in a sack-like fold of the skin; and the vitreous body is formed from embryonic sub-cutaneous tissue. To arrive, however, at a just conclusion regarding the formation of the eye, with all its marvellous yet not absolutely perfect characters, it is indispensable that the reason should conquer the imagination; but I have felt the difficulty far too keenly to be surprised at others hesitating to extend the principle of natural selection to so startling a length.

It is scarcely possible to avoid comparing the eye with a telescope. We know that this instrument has been perfected by the long-continued efforts of the highest human intellects; and we naturally infer that the eye has been formed by a somewhat analogous process. But may not this inference be presumptuous? Have we any right to assume that the Creator works by intellectual powers like those of man? If we must compare the eye to an optical instrument, we ought in imagination to take a thick layer of transparent tissue, with spaces filled with fluid, and with a nerve sensitive to light beneath, and then suppose every part of this layer to be continually changing slowly in density, so as to separate into layers of different densities and thicknesses, placed at different distances from each other, and with the surfaces of each layer slowly changing in form. Further we must suppose that there is a power, represented by natural selection

Kelleia, who was born with six fingers upon each hand, and the like number of toes to each of his feet.

[…]

Gratio Kelleia, the Maltese, married when he was twenty-two years of age, and, as I suppose there were no six-fingered ladies in Malta, he married an ordinary five-fingered person. The result of that marriage was four children; the first, who was christened Salvator, had six fingers and six toes, like his father; the second was George, who had five fingers and toes, but one of them was deformed, showing a tendency to variation; the third was Andre; he had five fingers and five toes, quite perfect; the fourth was a girl, Marie; she had five fingers and five toes, but her thumbs were deformed, showing a tendency toward the sixth.

These children grew up, and when they came to adult years, they all married, and of course it happened that they all married five-fingered and five-toed persons. Now let us see what were the results. Salvator had four children; they were two boys, a girl, and another boy; the first two boys and the girl were six-fingered and six-toed like their grandfather; the fourth boy had only five fingers and five toes. George had only four children; there were two girls with six fingers and six toes; there was one girl with six fingers and five toes on the right side, and five fingers and five toes on the left side, so that she was half and half. The last, a boy, had five fingers and five toes. The third, Andre, you will recollect, was perfectly well-formed, and he had many children whose hands and feet were all regularly developed. Marie, the last, who, of course, married a man who had only five fingers, had four children; the

> first, a boy, was born with six toes, but the other three were normal.[28]

The question of inheritance and variation are of no doubt, both in regard to personal experience and to scientific inquiry. Any person with a family will be able to verify it, just as any educated scientist will come to similar conclusions. What is observed by a father, as he notices his son's height being close to his, is not entirely different when a scientist observes that the ability to produce twins is hereditary. Similarly, when a couple of parents notice that the color of their child's hair is different than both of theirs, it is not much different than when a naturalist discovers hundreds of varieties of muscle development in humans. Essentially, the rest of this work will be written as though the principle of inheritance and variation, as above described, are true. In ending this section, I will quote Charles Darwin on the subject of inheritance and variation…

> As a single bud out of the many thousands, produced year after year on the same tree under uniform conditions, has been known suddenly to assume a new character; and as buds on distinct trees, growing under different conditions, have sometimes yielded nearly the same variety- for instance, buds on peach-trees producing nectarines, and buds on common roses producing moss-roses- we clearly see that the nature of the conditions is of subordinate importance in comparison with the nature of the organism in determining each particular form of variation…[29]

[28] "The Perpetuation of Living Beings, Hereditary Transmission and Variation," by Thomas Henry Huxley.

[29] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 1.

as perfect as is possessed by any member of the articulate class.

He who will go thus far, ought not to hesitate to go one step further, if he finds on finishing this volume that large bodies of facts, otherwise inexplicable, can be explained by the theory of modification through natural selection; he ought to admit that a structure even as perfect as an eagle's eye might thus be formed, although in this case he does not know the transitional states. It has been objected that in order to modify the eye and still preserve it as a perfect instrument, many changes would have to be effected simultaneously, which, it is assumed, could not be done through natural selection; but as I have attempted to show in my work on the variation of domestic animals, it is not necessary to suppose that the modifications were all simultaneous, if they were extremely slight and gradual. Different kinds of modification would, also, serve for the same general purpose: as Mr. Wallace has remarked, "if a lens has too short or too long a focus, it may be amended either by an alteration of curvature, or an alteration of density; if the curvature be irregular, and the rays do not converge to a point, then any increased regularity of curvature will be an improvement. So the contraction of the iris and the muscular movements of the eye are neither of them essential to vision, but only improvements which might have been added and perfected at any stage of the construction of the instrument." Within the highest division of the animal kingdom, namely, the Vertebrata, we can start from an eye so simple, that it consists, as in the lancelet, of a little sack of transparent skin, furnished with a nerve and lined with pigment, but desti-

with transparent gelatinous matter, projecting with a convex surface, like the cornea in the higher animals. He suggests that this serves not to form an image, but only to concentrate the luminous rays and render their perception more easy. In this concentration of the rays we gain the first and by far the most important step towards the formation of a true, picture-forming eye; for we have only to place the naked extremity of the optic nerve, which in some of the lower animals lies deeply buried in the body, and in some near the surface, at the right distance from the concentrating apparatus, and an image will be formed on it.

In the great class of the Articulata, we may start from an optic nerve simply coated with pigment, the latter sometimes forming a sort of pupil, but destitute of a lens or other optical contrivance. With insects it is now known that the numerous facets on the cornea of their great compound eyes form true lenses, and that the cones include curiously modified nervous filaments. But these organs in the Articulata are so much diversified that Muller formerly made three main classes with seven subdivisions, besides a fourth main class of aggregated simple eyes.

When we reflect on these facts, here given much too briefly, with respect to the wide, diversified, and graduated range of structure in the eyes of the lower animals; and when we bear in mind how small the number of all living forms must be in comparison with those which have become extinct, the difficulty ceases to be very great in believing that natural selection may have converted the simple apparatus of an optic nerve, coated with pigment and invested by transparent membrane, into an optical instrument

Section II: Adaptations

Aside from inheritance and variation, there is one other belief that is not disputed among those familiar with the natural world. This belief is that animals in the natural world are remarkably well adaptated to their natural environments. Among even those who diverge from the theory of Evolution, this is hardly doubted. It would take only a very small examination of natural organisms to see that they are quite fit their habitats. The question which may arise among naturalists, though, is not if this is true or not, but why this is true — at least, this may have been a cause for argument in the nineteenth century, when Darwin first made his proposal of Natural Selection. In this section, I shall briefly expand upon the idea that animals are well fit to the environments in which they live.

The amphibians and reptiles, closely related phylums of the animal kingdom, are very well fit to their environments, an attribute which does not widely differ from other organisms. The frog, for example, is covered with a skin that helps regulate temperature, water content, and respiration, accompanied by legs which are remarkable at jumping to avoid predators.[30] The newt has well developed eyes and is capable of regrowing lost limbs.[31] The salamander's skin secretes a protective, milky poison, which is harmless to humans, and in times of severe drought, they are known to burrow into the earth to avoid dehydration.[32] A relative of the frog, the toad's warty skin helps regulate moisture, and they are known to secrete poisonous or irritating substances from their skins when threatened by a predator.[33] The crocodile, perhaps the most fa-

[30] *Collier's Encyclopedia*, Lauren S. Bahr (editorial director) and Bernard Johnston (editor in chief), volume 10, pages 421–422.

[31] *Collier's Encyclopedia*, Lauren S. Bahr (editorial director) and Bernard Johnston (editor in chief), volume 17, page 465.

[32] *Collier's Encyclopedia*, Lauren S. Bahr (editorial director) and Bernard Johnston (editor in chief), volume 20, page 372.

[33] *Collier's Encyclopedia*, Lauren S. Bahr (editorial director) and Bernard Johnston (editor in chief), volume 22, page 341.

mous example of the reptile phylum, has a fleshy valve at the back of its mouth to prevent water from going into the air passages, and its webbed feet — a trait which many other aquatic animals have — aids in swimming.[34] Most lizards have been observed to change color to allow them to blend in with the current environment, thus avoiding predators; some lizards have teeth on the roof of their mouth to aid in hunting, while all lizards have scaly armor for protection.[35] Related to the lizard is the snake, which also has scaled protection; some snakes carry a poisonous venom to help neutralize prey or fend off predators, while every snake has elastic ligaments connecting the jaw to the skull, thus allowing consuming larger animals whole.[36] The defense of the turtle is obvious: it's shell, and it is well known that, though it has no teeth, the edges of the jaw are sharp for cutting food.[37]

Birds are also noted as being well fit to their environments, especially with the aid of flight, which is sometimes absent in certain species. The gull has webbed feet to help in aquatic movement and long narrow wings that allow for the unsurpassed ability to soar.[38] The ostrich, though devoid of the ability to fly, has long tough toenails, which it is sometimes known to defend itself with when fleeing is unsuccessful, and they have a keen sight for spotting potential predators.[39] The owl is a superb predator, with a

[34] *Collier's Encyclopedia*, Lauren S. Bahr (editorial director) and Bernard Johnston (editor in chief), volume 7, page 491.

[35] *Collier's Encyclopedia*, Lauren S. Bahr (editorial director) and Bernard Johnston (editor in chief), volume 14, page 705.

[36] *Collier's Encyclopedia*, Lauren S. Bahr (editorial director) and Bernard Johnston (editor in chief), volume 21, page 105.

[37] *Collier's Encyclopedia*, Lauren S. Bahr (editorial director) and Bernard Johnston (editor in chief), volume 22, pages 552–554.

[38] *Collier's Encyclopedia*, Lauren S. Bahr (editorial director) and Bernard Johnston (editor in chief), volume 11, page 533.

[39] *Collier's Encyclopedia*, Lauren S. Bahr (editorial director) and Bernard Johnston (editor in chief), volume 18, page 245.

subversive of the theory. How a nerve comes to be sensitive to light, hardly concerns us more than how life itself originated; but I may remark that, as some of the lowest organisms, in which nerves cannot be detected, are capable of perceiving light, it does not seem impossible that certain sensitive elements in their sarcode should become aggregated and developed into nerves, endowed with this special sensibility.

In searching for the gradations through which an organ in any species has been perfected, we ought to look exclusively to its lineal progenitors; but this is scarcely ever possible, and we are forced to look to other species and genera of the same group, that is to the collateral descendants from the same parent-form, in order to see what gradations are possible, and for the chance of some gradations having been transmitted in an unaltered or little altered condition. But the state of the same organ in distinct classes may incidentally throw light on the steps by which it has been perfected.

The simplest organ which can be called an eye consists of an optic nerve, surrounded by pigment-cells, and covered by translucent skin, but without any lens or other refractive body. We may, however, according to M. Jourdain, descend even a step lower and find aggregates of pigment-cells, apparently serving as organs of vision, without any nerves, and resting merely on sarcodic tissue. Eyes of the above simple nature are not capable of distinct vision, and serve only to distinguish light from darkness. In certain star-fishes, small depressions in the layer of pigment which surrounds the nerve are filled, as described by the author just quoted,

Another hypothetical consideration for the idea of Natural Selection is, if Natural Selection is reasonable, then would it not create an indefinite number of species, or why has it not done this? The simple reply to this is easy. Once an organism fills a place in nature where it can survive and reproduce, the following generations will only be adapted better to this current place in nature. There is not an indefinite amount of places where food can be obtained, so there will not be an indefinite amount of species surviving and reproducing.[4] One may argue that the unique and advanced nature of the eye, for instance, is by far too complex on organ for Natural Selection to create. To quote Charles Darwin…

> To suppose that the eye with all its inimitable contrivances for adjusting the focus to different distances, for admitting different amounts of light, and for the correction of spherical and chromatic aberration, could have been formed by natural selection, seems, I freely confess, absurd in the highest degree. When it was first said that the sun stood still and the world turned round, the common sense of mankind declared the doctrine false; but the old saying of Vox populi, vox Dei, as every philosopher knows, cannot be trusted in science. Reason tells me, that if numerous gradations from a simple and imperfect eye to one complex and perfect can be shown to exist, each grade being useful to its possessor, as is certainly the case; if further, the eye ever varies and the variations be inherited, as is likewise certainly the case and if such variations should be useful to any animal under changing conditions of life, then the difficulty of believing that a perfect and complex eye could be formed by natural selection, though insuperable by our imagination, should not be considered as

[4] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 4.

keen vision and hearing that make it lethal to lower animals.[40] The pelican has webbed feet, which it uses for running on water to gain acceleration so that it can fly with its bulky frame, and it uses its huge beak to capture fish and other animals living in water.[41] One of the most talked of birds, in regards to the theory of Evolution and Natural Selection, is the woodpecker. There is ample reason for this. The woodpecker's first and fourth towards are backward, whereas the second and third toes are forward, allowing it a firm grip on tree branches, and giving it the ability to scale trees fairly quickly. Since it's appetite is mostly insects living in trees, it has a hard bill fitted for tear off bark and a powerful neck for hammering. Its tongue is sticky and barbed, which allows it to ensnare insects.[42]

The case of mammals having a great deal of advantages should not come to any surprise to an well-observed naturalist. In a very real way, higher mammals mark the yet most advanced organism of this planet: the human. The elephant is equipped with a long trunk to aid in getting water and manipulating the physical world, as well as a thick skin for protection.[43] The giraffe is the tallest living animal, the length aiding in reaching high up for food; accompanying this length, the giraffe also has an exemplary vision, helping the creature to see predators and enemies from afar.[44] The kangaroo has powerful hind legs for traveling quickly, and with this the animal also has a pouch for carrying the young, as well as a sacculated (chambered) stomach, which will keep moisture in the

[40] *Collier's Encyclopedia*, Lauren S. Bahr (editorial director) and Bernard Johnston (editor in chief), volume 18, page 262.

[41] *Collier's Encyclopedia*, Lauren S. Bahr (editorial director) and Bernard Johnston (editor in chief), volume 18, page 537.

[42] *Collier's Encyclopedia*, Lauren S. Bahr (editorial director) and Bernard Johnston (editor in chief), volume 23, page 577.

[43] *Collier's Encyclopedia*, Lauren S. Bahr (editorial director) and Bernard Johnston (editor in chief), volume 9, page 79.

[44] *Collier's Encyclopedia*, Lauren S. Bahr (editorial director) and Bernard Johnston (editor in chief), volume 11, pages 106–107.

body when there is a drought — a serious threat in an environment like Australia where rainfall is unpredictable.[45] The koala bear has opposable digits, which allow it to grasp tree branches better, and when extremely young, it attaches to the teets of its mother, and it cannot be removed except with a forceful blow.[46] An African king, the lion has an adequately developed sight and smell, which aids it when it hunts at night. Also, the lion has powerful forelimbs, which allow it to tackle prey double its size, as well as strong jaw muscles, capable of breaking the vertebrae of its prey.[47] The tiger, a relative of the lion, has well developed legs, allowing it to leap thirty feet on to prey, and it is outfitted with canine teeth for tearing flesh.[48]

Finally, we come to the case of fish, organisms which dominate the largest size of habitat: the oceans. The catfish, which inhabits ponds, builds nests to protect the unborn, and it in certain species, they are known to walk from pond to pond, in search of food.[49] The eel has dorsal and anal fins which aid in transportation.[50] Though the term "minnow" has been used loosely to define any fish smaller than a man's finger, this is not the scientifically recognized definition. One of the species of minnow is known to have teeth, specifically used to scraping stones off of food.[51] The sting ray is equipped with a poisonous sting for attacking prey, and with en-

[45] *Collier's Encyclopedia*, Lauren S. Bahr (editorial director) and Bernard Johnston (editor in chief), volume 13, page 715.

[46] *Collier's Encyclopedia*, Lauren S. Bahr (editorial director) and Bernard Johnston (editor in chief), volume 14, page 129.

[47] *Collier's Encyclopedia*, Lauren S. Bahr (editorial director) and Bernard Johnston (editor in chief), volume 14, page 675.

[48] *Collier's Encyclopedia*, Lauren S. Bahr (editorial director) and Bernard Johnston (editor in chief), volume 22, page 314.

[49] *Collier's Encyclopedia*, Lauren S. Bahr (editorial director) and Bernard Johnston (editor in chief), volume 5, page 562.

[50] *Collier's Encyclopedia*, Lauren S. Bahr (editorial director) and Bernard Johnston (editor in chief), volume 8, page 628.

[51] *Collier's Encyclopedia*, Lauren S. Bahr (editorial director) and Bernard Johnston (editor in chief), volume 16, page 330.

because nature cannot choose anything, as it is not a sentient being. However, when we speak of nature, understand that I am only speaking of the laws that govern physical matter, the rules that man has defined to help him understand the Universe better. So, when we speak of Natural Selection, we are speaking of how the laws that govern our Universe eventually result with one creature, or organism, reigning supreme over another, thus, surviving and reproducing.[2]

One common argument against Evolution is, if organisms tend to rise and advance in organization through the means of Natural Selection, and thus become more adapted to their environment, why are there numerous creatures inhabiting all the niches of the ecological system? For instance, there are microscopic bacteria organisms. While they are small and occupy a small space, one may wonder why, through the means of Natural Selection, they do not rise and become more advanced and organized? The answer is as simple as this: though there are organisms of every level of organization, the reason for the existence of lower level creatures is due to the fact that, in their ecological niche, they are simple enough to gather enough energy, reproduce, and survive. If bacteria were to evolve into something as complex as a mammal, over the course of hundreds of millions of years, it would have been in vain if there was no food for the mammal to eat. Hence, we can see why humans have not advanced to the point where we are twenty or thirty feet tall — while it would be an ecological advantage, it would require us to eat massive amounts of food, unlike our current selves. The reason why microscopic bacteria is not leaving its current place, though it may evolve into other organisms that will fill other places where food is available, the reason for this is because they currently have enough food in their current place to survive and reproduce, which is enough for any organism to live.[3]

[2] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 4.

[3] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 4.

> Mr. Hudson states, frequents trees, and bores holes in the trunk for its nest. I may mention as another illustration of the varied habits of this genus, that a Mexican Colaptes has been described by De Saussure as boring holes into hard wood in order to lay up a store of acorns.
>
> Petrels are the most aerial and oceanic of birds, but in the quiet sounds of Tierra del Fuego, the Puffinuria berardi, in its general habits, in its astonishing power of diving, in its manner of swimming and of flying when made to take flight, would be mistaken by any one for an auk or a grebe; nevertheless it is essentially a petrel, but with many parts of its organisation profoundly modified in relation to its new habits of life; whereas the woodpecker of La Plata has had its structure only slightly modified. In the case of the water-ouzel, the acutest observer by examining its dead body would never have suspected its subaquatic habits; yet this bird, which is allied to the thrush family, subsists by diving- using its wings under water, and grasping stones with its feet. All the members of the great order of hymenopterous insects are terrestrial excepting the genus Proctotrupes, which Sir John Lubbock has discovered to be aquatic in its habits; it often enters the water and dives about by the use not of its legs but of its wings, and remains as long as four hours beneath the surface; yet it exhibits no modification in structure in accordance with its abnormal habits.[1]

Though Natural Selection is hardly doubted, even by those who confess to believe in a theory opposite of Evolution, there are still some to oppose it, and argue that Natural Selection is fictitious,

[1] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 6.

counters with humans, it is usually described as extremely painful and there are cases where it proves lethal.[52] The swordfish is the fastest fish in all of the oceans, and this would definitely serve as an advantage to this predator. Furthermore, it uses its sword to spear its prey.[53]

The single purpose of this section was to demonstrate that animals are fit to their environment. It was not my intention to argue that they were perfectly adaptated to where they are living. How is it that the state of organic organisms of our world today have reached their highly adaptive form of today? The question of how has been of much speculation for centuries, but science seems to have come to rest at this point, with the satisfying conclusion of Evolution. There is still the theory of Creationism, that argues that organisms of our world today are perfect due to the idea of an omnipotent god creating them, whereas scientists argue that Evolution through Natural Selection seems like a better view of the problem. Some have argued that the weakest part of the theory of Evolution is that all organic beings are considered imperfect, or, to quote Charles Darwin, "...a distinguished German naturalist has asserted that the weakest part of my theory is, that I consider all organic beings as imperfect: what I have really said is, that all are not as perfect as they might have been in relation to their conditions; and this is shown to be the case by so many native forms in many quarters of the world having yielded their places to intruding foreigners."[54] To quote Darwin, again...

> ...cases could be given of introduced plants which have become common throughout whole islands in a period of less than ten years. Several of the plants, such

[52] *Collier's Encyclopedia*, Lauren S. Bahr (editorial director) and Bernard Johnston (editor in chief), volume 21, page 532.

[53] *Collier's Encyclopedia*, Lauren S. Bahr (editorial director) and Bernard Johnston (editor in chief), volume 21, page 712.

[54] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 7.

> as the cardoon and a tall thistle, which are now the commonest over the whole plains of La Plata, clothing square leagues of surface almost to the exclusion of every other plant, have been introduced from Europe; and there are plants which now range in India, as I hear from Dr. Falconer, from Cape Comorin to the Himalaya, which have been imported from America since its discovery.[55]

It is the nature of the study of biology to be focused on the different adaptations and different attributes of organisms, which allow them to survive and prevail over competitors. In a later work, Charles Darwin describes some of the beneficial effects of some of the adaptations of the orangutan…

> Mr. Wallace, who has carefully studied the habits of the orang, remarks that the convergence of the hair towards the elbow on the arms of the orang may be explained as serving to throw off the rain, for this animal during rainy weather sits with its arms bent, and with the hands clasped round a branch or over its head. According to Livingstone, the gorilla also "sits in pelting rain with his hands over his head."* If the above explanation is correct, as seems probable, the direction of the hair on our own arms offers a curious record of our former state; for no one supposes that it is now of any use in throwing off the rain; nor, in our present erect condition, is it properly directed for this purpose.[56]

[55] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 3.

[56] Descent of Man, by Charles Darwin, 1871, chapter 6. Original source: Quoted by Reade, African Sketch Book, vol i., 1873, p. 152.

mouth, thus catching, almost like a whale, insects in the water.

As we sometimes see individuals following habits different from those proper to their species and to the other species of the same genus, we might expect that such individuals would occasionally give rise to new species, having anomalous habits, and with their structure either slightly or considerably modified from that of their type. And such instances occur in nature. Can a more striking instance of adaptation be given than that of a woodpecker for climbing trees and seizing insects in the chinks of the bark? Yet in North America there are woodpeckers which feed largely on fruit, and others with elongated wings which chase insects on the wing. On the plains of La Plata, where hardly a tree grows, there is a woodpecker (Colaptes campestris) which has two toes before and two behind, a long pointed tongue, pointed tail-feathers, sufficiently stiff to support the bird in a vertical position on a post, but not so stiff as in the typical woodpeckers, and a straight strong beak. The beak, however, is not so straight or so strong as in the typical woodpeckers, but it is strong enough to bore into wood. Hence this Colaptes in all the essential parts of its structure is a woodpecker. Even in such trifling characters as the colouring, the harsh tone of the voice, and undulatory flight, its close blood-relationship to our common woodpecker is plainly declared; yet, as I can assert, not only from my own observation, but from those of the accurate Azara, in certain large districts it does not climb trees, and it makes its nest in holes in banks! In certain other districts, however, this same woodpecker, as

Chapter 7: Arguments Against the Theory

The evidence, or reasons why I believe in the theory of Evolution, have been presented in the earlier chapters. This sole chapter is dedicated to answering arguments often presented against the Theory of Evolution. Though often not an argument against the theory of Natural Selection or Evolution, it is often wondered how the consciousness of an animal changes to adapt to its new body variations. I will here quote an excerpt of Darwin…

> Of cases of changed habits it will suffice merely to allude to that of the many British insects which now feed on exotic plants, or exclusively on artificial substances. Of diversified habits innumerable instances could be given: I have often watched a tyrant flycatcher (Saurophagus sulphuratus) in South America, hovering over one spot and then proceeding to another, like a kestrel, and at other times standing stationary on the margin of water, and then dashing into it like a kingfisher at a fish. In our own country the larger titmouse (Parus major) may be seen climbing branches, almost like a creeper; it sometimes, like a shrike, kills small birds by blows on the head; and I have many times seen and heard it hammering the seeds of the yew on a branch, and thus breaking them like a nuthatch. In North America the black bear was seen by Hearne swimming for hours with widely open

Section III: Natural Selection

In the previous two sections, I dealt with concepts which I will hereafter deal as fact. The first section dealt with inheritance and variation, how offspring often times resemble their progenitors, though differ in varying degrees. The second section, previously covered, deals with how organisms are adaptated to this world imperfectly, but fit enough to survive and reproduce. Finally, next there comes a sort of theory to bind these two sections. The theory of Natural Selection attempts to explain how organisms came about. To quote Charles Darwin…

> Owing to this struggle, variations, however slight and from whatever cause proceeding, if they be in any degree profitable to the individuals of a species, in their infinitely complex relations to other organic beings and to their physical conditions of life, will tend to the preservation of such individuals, and will generally be inherited by the offspring. The offspring, also, will thus have a better chance of surviving, for, of the many individuals of any species which are periodically born, but a small number can survive. I have called this principle, by which each slight variation, if useful, is preserved, by the term Natural Selection, in order to mark its relation to man's power of selection. But the expression often used by Mr. Herbert Spencer of the Survival of the Fittest is more accurate, and is sometimes equally convenient.[57]

Simply put, the theory of Natural Selection goes so far as to state that organisms which are fit to survival in their current environment have a better chance to survive. Using some of the examples I had in Section II, consider if a pelican had been born with

[57] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 3.

such a small beak, that it was unable to scoop up any fish from the water? Or, consider for example, if a frog or toad had been born that had skin that was not poisonous to other creatures, or if a woodpecker was born without claws, or if a turtle had been born without a shell? Under the current conditions, if an individual was born with such an attribute, it can be easy to see that they would have lesser chances of surviving. Furthermore, the possibility of variation cannot be denied. In Section I, I demonstrated very compelling evidence that organisms are likely to vary greatly, even if in the most minor or major details. Consider, again, for example, the man who could use his scalp muscles for moving a set of heavy books. In one way, it demonstrates variability, and how humans vary from each other, but in another way, it demonstrates inheritance, as that person's children were also capable of this same ability. Every advantage that an organism has will give it a higher chance of obtaining food and reproducing, thus creating more individuals with like traits — and of these organisms, the one which has the advantage to the highest degree, will have higher chances of success with mating and survival. So it will continue, organisms breeding and evolving, some species becoming extinct due to the fact that they could no longer compete in their environment, and new beneficial variations occurring To quote Charles Darwin…

> It may metaphorically be said that natural selection is daily and hourly scrutinising, throughout the world, the slightest variations; rejecting those that are bad, preserving and adding up all that are good; silently and insensibly working, whenever and wherever opportunity offers, at the improvement of each organic being in relation to its organic and inorganic conditions of life. We see nothing of these slow changes in progress, until the hand of time has marked the lapse of ages, and then so imperfect is our view into long-past geo-

old lines of descent or of true affinity."[45] As I stated in an earlier chapter, if it is true that there was a creator of all of the world's creatures, then here is another contradiction: the abundance of useless organs. In some recorded cases, children are observed having hairy foreheads, with no distinction between eyebrows and scalp: a sure sign of a reversion to an ape-like progenitor.[46] Another reversionary example: "They often secrete a few drops of milk at birth and at puberty: this latter fact occurred in the curious case before referred to, where a young man possessed two pairs of mammee."[47] And, also: "It is also a noticeable fact that in the prong-horned antelope, only a few of the females, about one in five, have horns, and these are in a rudimentary state, though sometimes above four inches long…"[48]

[45] The Descent of Man, by Charles Darwin, 1871, chapter 6.

[46] "Uber die Richtung der Haare, &c.," Muller's Archiv fur Anat. und Phys., 1837, s. 51.

[47] The Descent of Man, by Charles Darwin, 1871, chapter 6.

[48] "Antilocapra Americana. I have to thank Dr. Canfield for information with respect to the horns of the female: see also his paper in Proceedings of the Zoological Society, 1866, p. 109. Also Owen, Anatomy of Vertebrates, vol. iii., p. 627." (From: The Descent of Man, by Charles Darwin, 1871, chapter 8.)

> He who rejects with scorn the belief that the shape of his own canines, and their occasional great development in other men, are due to our early forefathers having been provided with these formidable weapons, will probably reveal, by sneering, the line of his descent. For though he no longer intends, nor has the power, to use these teeth as weapons, he will unconsciously retract his "snarling muscles" (thus named by Sir C. Bell), so as to expose them ready for action, like a dog prepared to fight.[42]

These vestigial organs serve no purpose, but in many instances, they are existing remnants of species we are related to. I will quote Darwin…

> Organs or parts in this strange condition, bearing the plain stamp of inutility, are extremely common, or even general, throughout nature. It would be impossible to name one of the higher animals in which some part or other is not in a rudimentary condition.[43]

In his later work of The Descent of Man, Darwin offered a plethora of evidences on behalf of the theory of Evolution. Among these evidences, there are vestigial organs. He would write, "He [mankind] retains many rudimentary and useless structures, which no doubt were once serviceable."[44] He also writes, "Hence we can see how it is that resemblances in several unimportant structures, in useless and rudimentary organs, or not now functionally active, or in an embryological condition, are by far the most serviceable for classification; for they can hardly be due to adaptations within a late period; and thus they reveal the

[42] The Descent of Man, by Charles Darwin, 1871, chapter 2.
[43] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 14.
[44] The Descent of Man, by Charles Darwin, 1871, chapter 6.

> logical ages, that we see only that the forms of life are now different from what they formerly were.[58]

It must be understood clearly, however, that Natural Selection is the theory of well adaptated organisms surviving and reproducing, whereas poorly adaptated organisms will have lower chances of survival and reproduction. There is very little reason not to believe in the validity of such a theory. Even if someone were to find the theory of Evolution as unacceptable, there is no reason why they ought to doubt the theory of Natural Selection, unless such a person is uneducated. However, there is still another theory that often attaches itself to Natural Selection. In several references in Origin of the Species, Darwin referred to it as the Derivative Theory (or, sometimes simply known as "Evolution"): the theory that all higher organisms that exist today evolved from lower organisms through the processes of Natural Selection. There are some who will doubt Evolution while holding the principles of Natural Selection to be fact. The idea of Evolution, though, is simply that the organisms that came about today exist because they formed variations that were successful in their habitats and had offspring with these adaptations, or they *evolved*. Again, to quote Charles Darwin…

> Natural Selection acts exclusively by the preservation and accumulation of variations, which are beneficial under the organic and inorganic conditions to which each creature is exposed at all periods of life. The ultimate result is that each creature tends to become more and more improved in relation to its conditions. This improvement inevitable leads to the gradual advancement of the organisation of the greater number of living beings throughout the world.[59]

[58] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 4.
[59] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 4.

As we look upon the principles of inheritance and variation, and we look to the natural world and see how organisms are extremely well fit to where they live, it seems only to be a logical deduction that the Origin of the Species came about through slight variations, each one leaning towards a well-fit end result Sigmund Freud writes, "In the animal kingdom we hold to the view that the most highly developed species have proceeded from the lowest; and yet we find all the simple forms still in existence to-day. The race of the great saurians is extinct and has made way for the mammals; but a true representative of it, the crocodile, still lives among us."[60] In his work The Descent of Man, Darwin describes Natural Selection as it happened between human tribes: "We can see, that in the rudest state of society, the individuals who were the most sagacious, who invented and used the best weapons or traps, and who were best able to defend themselves, would rear the greatest number of offspring."[61] Before ending this section, I will quote Darwin again in regards to Natural Selection…

> The formation of different languages and of distinct species, and the proofs that both have been developed through a gradual process, are curiously parallel. But we can trace the formation of many words further back than that of species, for we can perceive how they actually arose from the imitation of various sounds. We find in distinct languages striking homologies due to community of descent, and analogies due to a similar process of formation. The manner in which certain letters or sounds change when others change is very like correlated growth. We have in both cases the reduplication of parts, the effects of long-continued use,

[60] "Civilization and Its Discontents," by Sigmund Freud, 1930. Published by W.W. Norton & Company, translated and edited by James Strachey (copyright 1961), with a biographical introduction by Peter Gay. Chapter 1, pages 15–16.

[61] The Descent of Man, by Charles Darwin, 1871, chapter 5.

placement of hair on the body of humans, typically it is common for a body to be naked of hair, but the body hair can develop into thick, long, dark, and coarse hair — a type of vestigial organ from our predecessors.[36] Some holly-trees, for example, will bear only male seeds, yet they are equipped with a rudimentary pistil, which can only be used by female trees for reproduction.[37] It is doubted by no one that webbed feet are an advantage for aquatic animals, yet upland geese and the frigate bird have this adaptation, and they are non-aquatic, though there is reason to believe there ancestors are.[38] In the human digestive system, as in the digestive system of many other organisms, there is a caecum, a pouch connected to the intestines. Though present in many lower organisms, in humans it is extremely small, while in the koala it is thrice its size, and in humans, there are instances where it is entirely absent altogether.[39] Not only is it useless like the appendix, but like the appendix, it can be a cause of death through cancer or inflammation.[40] In the human jaw, canine teeth seem to serve no purpose at all. The initial purpose is believed to be a sort of fighting mechanism, but since man developed tools and weapons, it became a vestige, and ancient skulls have been found where the canine teeth are enormous.[41] To quote Charles Darwin…

[36] Eschricht, "Uber die Richtung der Haare am menschlichen Korper," Muller's Archiv fur Anat. und Phys., 1837, s. 47. I shall often have to refer to this very curious paper. And… Paget, Lectures on Surgical Pathology, 1853, vol. i., p. 71.

[37] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 4.

[38] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 6.

[39] Owen, Anatomy of Vertebrates, vol. iii., pp 416, 434, 441. And… Annuario della Soc. d. Nat. Modena, 1867, p. 94.

[40] M. C. Martins ("De l'Unite Organique," in Revue des Deux Mondes, June 15, 1862, p. 16) and Haeckel (Generelle Morphologie, B. ii., s. 278), have both remarked on the singular fact of this rudiment sometimes causing death.

[41] Anatomy of Vertebrates, vol. iii., 1868, p. 323. And… Generelle Morphologie, 1866, B. ii., s. clv. And… Carl Vogt's Lectures on Man, Eng. translat., 1864, p. 151. And… C. Carter Blake, on a jaw from La Naulette, Anthropological Review, 1867, p. 295. Schaaffhausen, ibid., 1868, p. 426.

but I have never heard, on sufficient evidence, of a man who possessed this power, the one which might be of use to him."[31] The ears of the chimpanzee and the orangutan are in a similar condition of man, with underdeveloped muscles, and it is rare for a sighting of a such a primate moving their ears.[32] It has been stated that the ear lobe is distinct only to humans, but a rudiment of it may be found in the gorilla, and in some individuals of African descent, it is absent altogether.[33] Humans contain a secondary set of eyelids, known as the "semilunar fold" (scientific name: plica semiluna'ris conjuncti'vae), and this can be found in many of the lower animals, yet in mankind, there is no muscle adaptated for moving this set of eyelids.[34] The sense of smell in humans, compared to that of other animals, is considerably underdeveloped and of almost no practical use; but, it is good to take into consideration that aboriginal natives are capable of identifying someone in the dark by their smell.[35] For some individuals of European descent, there are tufts of hair on the shoulder; though there tends to be a great deal of variability in the

[31] The Descent of Man, by Charles Darwin, 1871, chapter 1.

[32] Professor A. Macalister, Annals and Magazine of Natural History, vol. vii., 1871, p. 342.

[33] Mr. St. George Mivart, Elementary Anatomy, 1873, p. 396.

[34] Muller's Elements of Physiology, Eng. translat., 1842, vol. ii., p. 1117. Owen, Anatomy of Vertebrates, vol. iii., p. 260; ibid., on the walrus, Proceedings of the Zoological Society, November 8, 1854. See also R. Knox, Great Artists and Anatomists, p. 106. This rudiment apparently is somewhat larger in Negroes and Australians than in Europeans, see Carl Vogt, Lectures on Man, Eng. translat., p. 129.

[35] The account given by Humboldt of the power of smell possessed by the natives of South America is well known, and has been confirmed by others. M. Houzeau (Etudes sur les Facultes Mentales, &c., tom. i., 1872, p. 91) asserts that he repeatedly made experiments, and proved that Negroes and Indians could recognise persons in the dark by their odour. Dr. W. Ogle has made some curious observations on the connection between the power of smell and the colouring matter of the mucous membrane of the olfactory region as well as of the skin of the body. I have, therefore, spoken in the text of the dark-coloured races having a finer sense of smell than the white races. See his paper, Medico-Chirurgical Transactions, London, vol. liii., 1870, p. 276.

and so forth. The frequent presence of rudiments, both in languages and in species, is still more remarkable. The letter m in the word am, means I; so that in the expression I am, a superfluous and useless rudiment has been retained. In the spelling also of words, letters often remain as the rudiments of ancient forms of pronunciation. Languages, like organic beings, can be classed in groups under groups; and they can be classed either naturally according to descent, or artificially by other characters. Dominant languages and dialects spread widely, and lead to the gradual extinction of other tongues. A language, like a species, when once extinct, never, as Sir C. Lyell remarks, reappears. The same language never has two birth-places. Distinct languages may be crossed or blended together. We see variability in every tongue, and new words are continually cropping up; but as there is a limit to the powers of the memory, single words, like whole languages, gradually become extinct. As Max Muller has well remarked:- "A struggle for life is constantly going on amongst the words and grammatical forms in each language. The better, the shorter, the easier forms are constantly gaining the upper hand, and they owe their success to their own inherent virtue." To these more important causes of the survival of certain words, mere novelty and fashion may be added; for there is in the mind of man a strong love for slight changes in all things. The survival or preservation of certain favoured words in the struggle for existence is natural selection.[62]

[62] The Descent of Man, by Charles Darwin, 1871, chapter 2.

Section IV: A Note on Further Chapters

The purpose of this chapter was to lay out some fundamental principles that were necessary to explaining, and then proving, the theory of Evolution, namely the principles of inheritance, variation, the well-fit nature of organisms today, and the theory of Natural Selection. I cannot ask anyone to believe that the species of the world today is due to a long chain of variations and alterations which eventually led to the creation of where we are now. So far, such an assertion would be rather speculative, though logical. At least, it would seem logical to make such a conclusion, but we have no evidence. The following chapters shall deal with the evidence of Evolution. While studying and researching the works of Naturalists, I found an overwhelming amount of evidence. However, the evidence seemed a great deal jumbled, or at least, unorganized. In the following chapters, I will try to demonstrate the evidence for the Derivative Theory in an organized manner. The evidences I have for Evolution are as follows: results of Selective Breeding in domestic organisms, similarities occurring in different organisms, reversionary organs, and vestigial organs. Each piece of evidence is a part of what I would call Interrelation: the theory that all organisms are related to each other in some way. Vestigial organs, sometimes called "rudiments" or "rudimentary organs," are organs which serve no purpose to an organism, yet would have served as a purpose to a life form in a previous state, such as a progenitor evolving into the new state and remnants of the older species are still found in the new one. Reversionary organs — when appearing known simply as "reversion" — are organs which are vestigial, yet unlike vestigial organs, they differ in that they only appear in some individuals of a species. To quote Charles Darwin, "These several reversionary structures, as well as the strictly rudimentary ones, reveal The Descent of Man from some lower form in an unmistakpers.[26] In regards to vestigial organs appearing in domestic organs, I will here quote Charles Darwin…

> We have plenty of cases of rudimentary organs in our domestic productions,- as the stump of a tail in tailless breeds,- the vestige of an ear in earless breeds of sheep,- the reappearance of minute dangling horns in hornless breeds of cattle, more especially, according to Youatt, in young animals,[27]

The os coccyx of humans serves no purpose, though it is an internal tail of human beings. It is constructed in the same manner that the os coccyx of apes are developed, and the muscles and vertebrae of it are quite similar to that of the tails of lower animals.[28] There are some who will argue that the os coccyx is not vestigial and that it serves a purpose. How would they respond, then, to those human beings whose os coccyx has developed fully into a tail, and have no problems functioning without an internal tail? Many animals are capable of twitching their skin, such as horses, and humans retain some of these muscles, such as the platysma myoides, which are developed on the back of the neck.[29] It is not deniable that certain humans are capable of moving their ears forward, backward, downward, and upward, muscles which serve no more purpose than if we had muscles to move our nose.[30] To quote Darwin, "The power of erecting and directing the shell of the ears to the various points of the compass, is no doubt of the highest service to many animals, as they thus perceive the direction of danger;

[26] "Underwater Adventure" by By Dave Ackerman, published by the Columbus Dispatch, 2000.

[27] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 14.

[28] Revue d'Anthropologie, by Professor Broca, 1872; "La Constitution des vertebres caudales."

[29] Professor W. Turner, Proceedings of the Royal Society of Edinburgh, 1866–67, p. 65.

[30] Annuario della Soc. dei Naturalisti, Modena, 1897, p. 97.

nearby. In domesticated chickens, they still have this instinct, but it is useless, as they are incapable of flight.[17]

For many snakes, they are equipped with a functionless, underdeveloped second lung.[18] Snakes in the family Boidae (boas and pythons) occasionally don't use both lungs, though they have a pelvis and extremely poorly developed hind-legs; snakes in the family colubridae (colubrid snakes), the left lung is either absent or extremely underdeveloped.[19] The bastard wing, a tuft of feathers on the fifth digit of many birds, is highly rudimentary, and in some cases it cannot be used for flight.[20] When whales are still a fetus, they have been observed to developed teeth, which disappear by the time they are adults.[21] Unborn calves are a similar situation, where they develop teeth in their jaws that never cut through the gums.[22] In some beetles that are closely allied to flying insects, underneath the wing covers, there appears to be two membranes connected together, not much unlike those of the flying insects.[23] The Apteryx is a bird from New Zealand, and though it is winged, it is incapable of flight.[24] In the order of Dipnoi, there is an eel-shaped fish with vestigial organs of the axis of a fin, with the lateral rays of branches aborted.[25] Manatees are known to have nails on their flip-

[17] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 8.

[18] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 14.

[19] Scientific and common names from J T Collins, Standard common and current scientific names for North American amphibians and reptiles, Third Edition, Soc Study Amph & Rept Herp Circular No , Order of families from J L Behler and F W King, The Audubon Society Field Guide to North American Reptiles and Amphibians, Alfred A Knopf. Compiled for Slater Museum of Natural History, University of Puget Sound, Tacoma, WA , by Doug Henderson and Dennis Paulson, October, 1995.

[20] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 14.

[21] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 14.

[22] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 14.

[23] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 14.

[24] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 14.

[25] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 14.

able manner."[63] When vestigial or reversionary organs appear in a being, they are often underdeveloped, to the point where even if they once serve a purpose, today they do not. There is an Evolutionary shift towards beings without any useless organs, but this shift is not as strong as the one away from injurious organs or the shift towards beneficial ones. The reason why it would be of use for an organism to not have useless appendages is, as Darwin once wrote, "If under changed conditions of life a structure, before useful, becomes less useful, its diminution will be favoured, for it will profit the individual not to have its nutriment wasted in building up an useless structure."[64]

[63] The Descent of Man, by Charles Darwin, 1871, chapter 2.

[64] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 5.

Chapter 2: Selective Breeding and Domestic Organisms

One of the primary arguments against the theory of Evolution is the claim that the process of Natural Selection has never produced a new species. I have often heard, "Evolution has never been observed to cause extinction or new species." However, this claim is false, and any person would be able to see this, even if they had only a slight education of the expansive field of breeding. For thousands of years, mankind has been breeding and rearing domestic animals and crops. Typically, farmers or ranchers will breed those animals which are best outfitted for the harvesting purposes. As an example, a corn farmer will plant 100 crops, and once these crops are each equipped with seeds and the farmer is read to plant again, he will take 100 seeds from the tallest corn stalk, and plant them again. According to the laws of inheritance, these 100 new corn plants will be tall, and according to the laws of variation, these 100 new corn plants will also vary in height. Once the corn farmer has done this process for several years, an entirely new species of corn would have developed. This process is known as Selective Breeding. To quote Charles Darwin, "The key is man's power of accumulative selection: nature gives successive variations; man adds them up in certain directions useful to him. In this sense he may be said to have made for himself useful breeds."[1]

A great deal of our modern fruits and vegetables are often new species related to an older, inedible model. The pear, for example, was described by authors thousands of years ago as a fruit

[1] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 1.

in almost any continent will be able to confess to discovering such a creature.[10] Moles, a creature which burrow underneath the earth's surface, often have eyes which are covered in fur and hair; in South America, the tuco-tuco (or Ctenomys), which are more subterranean than the mole, are frequently blind, though they are born with eyes.[11] Several creatures, inhabiting the caves of Carniola and of Kentucky, are known to be blind though endowed with eyes.[12] In some crabs, known to inhabit extremely dark places such as cave, the foot stalk — which typically supports the eye — still exists, though the eyes are gone.[13] Caverats, which typically are equipped with large eyes, are typically blind, but after being exposed to light for about a month, they acquire a dim perception of objects.[14] The Bathyscia, an insect species, are known to appear in several varieties; typically, those that inhabit caves are a sub-species, typically appearing blind and reproducing blind offspring, whereas another sub-species, normally inhabiting shady rocks not far from these caves, are known to be endowed with full vision.[15] In the human fetus, on the neck there are slits, representing gills, and there are arteries developing on the neck showing where these slits would be, yet as the fetus develops both the slits and arteries disappear.[16] In the world untainted by mankind's touch, the wild chickens flee from the sight of dogs, yet in domesticated chickens, this instinct has been wholly lost. Furthermore, when a wild hen feels danger, she lets off a danger call as she flies away and her chicks hide in the thickets or grass

[10] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 5.
[11] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 5.
[12] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 5.
[13] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 5.
[14] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 5.
[15] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 5.
[16] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 6.

are furnished with three separate fangs and are generally sound.[3] Professor Schaaffhausen argues that the reason why wisdom-teeth are vestigial to European humans is due to the fact that the jaw is shorter in European humans, and the reason for this occurrence is believed that Europeans eat soft, cooked food, that extra teeth become rudimentary.[4] To quote one scientific encyclopedia…

> VESTIGIAL STRUCTURES. Elements appearing in various life forms which, although often quite underdeveloped, are no longer needed or functional and represent a carry-over from more primitive forms. The human appendix is an example.[5]

The logger-headed duck of South America and the domestic Aylesbury duck cannot fly when they are adults with their wings, though their young are capable of flight.[6] The ostrich is equipped with wings, yet it is entirely incapable of flying.[7] In many of the male dung beetles, the anterior tarsi, or the feet, have fallen off at an early stage in their development, to the point where it is rare to find one with feet.[8] In other insects, such as the Onites apelles and the Ateuchus (or the sacred beetle of the Egyptians), the feet are so habitually lost, that according to most records, they are described as not having them.[9] In Madeira, a river in northwest Brazil, out of 550 species of beetles, there are 200 beetles which have wings that are so deficient, that they are incapable of flight, and even those who are amateur Naturalists

[3] Owen, Anatomy of Vertebrates, vol. iii., pp. 320, 321, and 325.

[4] "On the Primitive Form of the Skull," Eng. translat., in Anthropological Review, Oct., 1868, p. 426.

[5] *Van Nostrand's Scientific Encyclopedia*, Fifth Edition, edited by Douglas M. Considine, page 2281.

[6] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 5.

[7] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 5.

[8] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 5.

[9] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 5.

of inferior, inedible quality, but today it is sold by every grocery store.[2] Wheat, as well, has been domesticated by mankind over the process of thousands of years.[3] It is not difficult to find an improvement in the beauty of flowers, when we compare today's flowers to drawings of flowers from decades or centuries ago.[4] Domesticated dogs rarely ever attack sheep or other domesticated animals, as this is seen in the instance of Sheep Dogs particularly, but when foreigners take undomesticated puppies from the natives of Tierra Del Fuego, the instinct to attack livestock and even humans.[5] There remains little doubt among naturalists today that domesticated rabbits are descendants of wild rabbits[6] To quote Charles Darwin, "In the case of strongly marked races of some other domesticated species, there is presumptive or even strong evidence, that all are descended from a single wild stock."[7] In Britain, it was once shown that over the course of several years, the cattle have increased in weight and maturity, a beneficial factor to those who are in the slaughter business.[8] Bakewell and Collins are also known for modifying their cattle through the process of Natural Selection.[9] When two flocks of Leicester sheep were kept, one by Mr. Buckley and one by Mr. Burgess, after some time, an observer remarked that the sheep, "have been purely bred from the original stock of Mr. Bakewell for upwards of fifty years. There is not a suspicion existing in the mind of any one at all acquainted with the subject, that the owner of either of them has deviated in any one instance from the pure blood of Mr. Bakewell's flock, and yet the difference between the sheep possessed by these two gentlemen is so great

[2] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 1.

[3] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 1.

[4] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 1.

[5] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 8.

[6] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 1.

[7] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 1.

[8] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 1.

[9] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 1.

that they have the appearance of being quite different varieties."[10] To quote Darwin, "…to assert that we could not breed our cart- and race-horses, long and short-horned cattle, and poultry of various breeds, and esculent vegetables, for an unlimited number of generations, would be opposed to all experience."[11] A quote by Charles Darwin…

> In practice, a fancier is, for instance, struck by a pigeon having a slightly shorter beak; another fancier is struck by a pigeon having a rather longer beak; and on the acknowledged principle that "fanciers do not and will not admire a medium standard, but like extremes," they both go on (as has actually occurred with the sub-breeds of the tumbler-pigeon) choosing and breeding from birds with longer and longer beaks, or with shorter and shorter beaks. Again, we may suppose that at an early period of history, the men of one nation or district required swifter horses, whilst those of another required stronger and bulkier horses. The early differences would be very slight; but, in the course of time from the continued selection of swifter horses in the one case, and of stronger ones in the other, the differences would become greater, and would be noted as forming two sub-breeds. Ultimately, after the lapse of centuries, these sub-breeds would become converted into two well-established and distinct breeds. As the differences became greater, the inferior animals with intermediate characters, being neither swift nor very strong, would not have been used for, breeding, and will thus have tended to disappear.[12]

[10] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 1.
[11] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 1.
[12] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 4.

Chapter 6: Interrelation through Vestigial Organs

The final piece of living evidence that I have to offer is that of vestigial organs. In a very real sense, reversionary organs are equally vestigial, or useless. But I have separated the two as a way to help understanding of them both. A "vestigial organ" be may defined as an organ which serves no purpose to an organism. Reversionary organs are the same, but the difference that I have between this and the last chapter is that vestigial organs always appear in a species, whereas reversionary organs appear in only some cases.

As far as personal experience goes, it is undeniable that many of us come into contact with vestigial organs, or can identify them on ourselves personally. For instance, males have nipples, an organ which serves a purpose to females but is entirely useless to men.[1] In domestic cows, there are four developed mammae, capable of producing milk and there are two other nipples which are rudimentary and serve no purpose — yet there is a rare occurrence where these two rudimentary nipples become well developed and produce milk.[2] So, in the case of domestic cows, not only are they vestigial, but in some instances, they show cases of reversion. It is not deniable that wisdom-teeth are vestigial, in that many cases, not only do they fail to appear, but once they do appear, they surgical must be removed. Though wisdom-teeth are vestigial in the case of European humans, in the Melanian races, the wisdom-teeth

[1] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 14. The Descent of Man, by Charles Darwin, 1871, chapter 1.
[2] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 14.

> peculiarity is often transmitted from one sex to both sexes, or to one sex alone, more commonly but not exclusively to the like sex.[15]

In his later works, Darwin would describe other instances of reversion. For example, he would write: "…injurious characters which tend to reappear through reversion, such as blackness in sheep…"[16] And, also…

> Characters occasionally make their re-appearance in him, which we have reason to believe were possessed by his early progenitors. If the origin of man had been wholly different from that of all other animals, these various appearances would be mere empty deceptions; but such an admission is incredible. These appearances, on the other hand, are intelligible, at least to a large extent, if man is the co-descendant with other mammals of some unknown and lower form.
>
> […]
>
> The early progenitors of man must have been once covered with hair, both sexes having beards; their ears were probably pointed, and capable of movement; and their bodies were provided with a tail, having the proper muscles. Their limbs and bodies were also acted on by many muscles which now only occasionally reappear, but are normally present in the Quadrumana.[17]

[15] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 1.
[16] The Descent of Man, by Charles Darwin, 1871, chapter 5.
[17] The Descent of Man, by Charles Darwin, 1871, chapter 6.

Several decades after the death of Charles Darwin, Sigmund Freud writes, "…the breeding of domesticated animals flourishes."[13] Thomas Malthus, a reverend of the 1700's, would describe what was very much common knowledge of that era, "Were it of consequence to improve pinks and carnations, though we could have no hope of raising them as large as cabbages, we might undoubtedly expect, by successive efforts, to obtain more beautiful specimens than we at present possess."[14] In a longer section, he writes…

> I am told that it is a maxim among the improvers of cattle that you may breed to any degree of nicety you please, and they found this maxim upon another, which is that some of the offspring will possess the desirable qualities of the parents in a greater degree. In the famous Leicestershire breed of sheep, the object is to procure them with small heads and small legs. Proceeding upon these breeding maxims, it is evident that we might go on till the heads and legs were evanescent quantities, but this is so palpable an absurdity that we may be quite sure that the premises are not just and that there really is a limit, though we cannot see it or say exactly where it is. In this case, the point of the greatest degree of improvement, or the smallest size of the head and legs, may be said to be undefined, but this is very different from unlimited, or from indefinite, in Mr Condorcet's acceptation of the term. Though I may not be able in the present instance to mark the limit at which further improvement will stop, I can very easily mention a

[13] "Civilization and Its Discontents," by Sigmund Freud, 1930. Published by W.W. Norton & Company, translated and edited by James Strachey (copyright 1961), with a biographical introduction by Peter Gay. Chapter 3, page 45.
[14] "An Essay on the Principle of Population," by Thomas Malthus, Chapter 14, 1798.

> point at which it will not arrive. I should not scruple to assert that were the breeding to continue for ever, the head and legs of these sheep would never be so small as the head and legs of a rat.[15]

I again state, that the process of Selective Breeding must be admitted as a great evidence on behalf of the theory of Evolution. If organisms can change dramatically, into different races, species, or families, under the hand of mankind, then why is it so difficult to believe that it cannot happen in a natural state of things? The processes of Selective Breeding and Evolution are nearly identical, with the solitary difference being that the first happens with a human guide, while the second with nature as a guide. Thomas Henry Huxley describes the process of Selective Breeding as it occurs in the domestic dog…

> …there are some dogs very much smaller than others; indeed, the variation is so enormous that probably the smallest dog would be about the size of the head of the largest; there are very great variations in the structural forms not only of the skeleton but also in the shape of the skull, and in the proportions of the face and the disposition of the teeth.
>
> The Pointer, the Retriever, Bulldog, and the Terrier, differ very greatly, and yet there is every reason to believe that every one of these races has arisen from the same source…[16]

With all of this evidence considered, I feel that there should be no doubt that Selective Breeding is an active form of Evolution, but simply under the hand of mankind.

[15] "An Essay on the Principle of Population," by Thomas Malthus, Chapter 9, 1798.

[16] "The Perpetuation of Living Beings, Hereditary Transmission and Variation," by Thomas Henry Huxley.

cle on both sides of the neck, and this muscle is also found in all higher and lower apes. There is a similar case where men are sometimes known to have an abductor (or a tissue that pulls muscles or organs in a certain direction) in the metatarsal bone of the fifth digit. While it is in only some humans, it is present in all apes.[10] The acromio-basilar muscle is related to the walk of those animals which walk on all fours, and it is found in all animals below man, but one is sixty human beings is born with this muscle.[11] In apes and monkeys, in the humerus bone, there is a passage known as the supra-condyloid foramen, where the nerve of the fore limb and often the great artery pass. In humans, there is a trace of it, but in certain humans, it appears even well developed, with the nerve and great artery passing through.[12] The giraffe of Africa typically has two horns attached to its skull, but there are occasions where a third horn occurs.[13] In regard to reversionary organs, Darwin has remarked, "That this unknown factor is reversion to a former state of existence may be admitted as in the highest degree probable."[14] And, a quote by the father of Natural Selection…

> No one can say why the same peculiarity in different individuals of the same species, or in different species, is sometimes inherited and sometimes not so; why the child often reverts in certain characters to its grandfather or grandmother or more remote ancestor; why a

[10] See also Prof. Macalister in Proceedings, Royal Irish Academy, vol. x., 1868, p. 124.

[11] Mr. Champneys in Journal of Anatomy and Physiology, Nov., 1871, p. 178.

[12] With respect to inheritance, see Dr. Struthers in the Lancet, Feb. 15, 1873, and another important paper, ibid., Jan. 24, 1863, p. 83. Dr. Knox, as I am informed, was the first anatomist who drew attention to this peculiar structure in man; see his Great Artists and Anatomists, p. 63. See also an important memoir on this process by Dr. Gruber, in the Bulletin de l'Acad. Imp. de St. Petersbourg, tom. xii., 1867, p. 448.

[13] *Collier's Encyclopedia*, Lauren S. Bahr (editorial director) and Bernard Johnston (editor in chief), volume 11, page 106.

[14] The Descent of Man, by Charles Darwin, 1871, chapter 2.

eating, as well as using their mouth in aid as a third hand and in some cases they are remarkably hairy.[6] To quote Charles Darwin, "The simple brain of a microcephalous idiot, in as far as it resembles that of an ape, may in this sense be said to offer a case of reversion."[7] The molar bone of humans, which is two bones when in the fetus at two months of age, sometimes remains in two separate distinct bones, which is a natural part of the physiology of other mammals.[8] Professor Vlacovich examined forty male subjects, and he discovered a muscle, called by him the "ischio-pubic", in nineteen of them and in three others there was a ligament representing this muscle. In only two out of thirty female subjects, this muscle was developed on both sides yet in three others, there was a rudimentary ligament for this muscle.[9] One out of every sixty men are believed to have a powerful "levator claviculae," a mus-

[6] Memoires sur les Microcephales, by Vogt, 1867, pp. 50, 125, 169, 171, 184–198. And… Prof. Laycock sums up the character of brute-like idiots by calling them theroid; Journal of Mental Science„ July, 1863. Dr. Scott (The Deaf and Dumb, 2nd ed., 1870, p. 10) has often observed the imbeciles smelling their food. See, on this same subject, and on the hairiness of idiots, Dr. Maudsley, Body and Mind, 1870, pp. 46–51. Pinel has also given a striking case of hairiness in an idiot.

[7] The Descent of Man, by Charles Darwin, 1871, chapter 2.

[8] Annuario della Soc. dei Naturalisti, Modena, 1867, p. 83. Prof. Canestrini gives extracts on this subject from various authorities. Laurillard remarks, that as he has found a complete similarity in the form, proportions, and connection of the two molar bones in several human subjects and in certain apes, he cannot consider this disposition of the parts as simply accidental. Another paper on this same anomaly has been published by Dr. Saviotti in the Gazzetta delle Cliniche, Turin, 1871, where he says that traces of the division may be detected in about two per cent of adult skulls; he also remarks that it more frequently occurs in prognathous skulls, not of the Aryan race, than in others. See also G. Delorenzi on the same subject; "Tre nuovi casi d'anomalia dell' osso malare," Torino, 1872. Also, E. Morselli, "Sopra una rara anomalia dell' osso malare," Modena, 1872. Still more recently Gruber has written a pamphlet on the division of this bone. I give these references because a reviewer, without any grounds or scruples, has thrown doubts on my statements.

[9] Quoted by Prof. Canestrini in the Annuario, della Soc. dei Naturalisti, 1867, p. 90.

The process of Evolution, when in the hands of man, has been clearly observed to create new species of organisms. Natural Selection, though, with wild organisms, seems to be much more thorough and accurate than civilization. Whereas humans will judge an organism and choose which to breed, nature — or at least, the laws that govern the physical Universe — will kill those organisms which are not fit for survival or capable of breeding. As far as the theory of Evolution explaining the Origin of the Species as they exist today, it would seem adequate with the evidence that can be attributed to Selective Breeding. However, while the processes of Evolution can be shown to be adequate, as in the case of Selective Breeding, is there any direct evidence that natural Evolution is responsible for the creation of organisms as they exist today? I shall proceed to answer this question in the following chapters.

Chapter 3: Sexual Selection

While it seems that there is no doubt, that the processes of inheritance and variation can be productively used with Selective Breeding, there might be some arguments against such a theory being applied to the natural world. When observing the natural world, there is no doubt that every organism seems to be perfectly (or nearly perfectly, or at least, perfectly enough) adaptated to its environment. From the teeth of the tiger to the strong legs of the gazelle; from the powerful jaws of a shark to the powerful fins of whales. Everywhere on this planet, there is no doubt that organisms are well adaptated to their environments. There are two responses to this observation: that organisms were created perfectly by a creator, or that organisms evolved to their current state through the processes of inheritance and variation serving them, and consequently dividing them into the complex organization we have afforded them. The enormous evidence on behalf of the theory of Evolution is presented in this book. The evidence on behalf of a creation theory, much to the dismay (or delusion) of Creationists, is rather non-existent A person might ask how the pen they are holding was placed in their hand, and if they have enough conviction and lack enough reason, they might force themselves to honestly believe that god created every molecule of the pen at that very moment. Witnesses might say that they saw the person pick up the pen, that they saw it delivered to their desk, that it came from a store, and then from a factory. They will deny it, saying, "My theory explains it equally well." And, so, we have the essential arguments between Evolution scientists and religious Creationists. However, it was not my intention to attack Creationism in this

tree, we will be running across new races and new species. So, if an organism is born with a reversionary organ which is similar to what we believe to be that organism's ancestors, then it is clear evidence that this modern creature is a descendant, and the theory of Evolution holds true.

One of the most notable examples would be a human baby who was born with a tail in the year 2002.[1] However, this is not the first instance of a human baby with a tail; in 1982, Dr Fred Ledley wrote a report on these occurrences[2] This is a clear sign that humans were once related to fish.

It is well known among breeders that when two creatures breed which are of a different race or species, it is likely for reversionary attributes to reappear. For instance, it is well believed by scientists and Evolutionary thinkers today that the several species of domesticated pigeons all are descendants of the wild rock pigeon. When domestic pigeons of different species have been cross-bred, it has been observed that they tend to revert back to the colors of the rock-pigeon, colors which did not occur in their direct parents.[3] Donkeys sometimes have stripes on their legs, which are distinctly similar to those on zebra, and there are numerous examples of stripes forming on species which we believe are descendants of the zebra.[4] Pigs are known to sometimes, though rarely, be born with a sort of proboscis, or trunk-like nose.[5] Microcephalic idiots are another example of reversion. These individuals, often times born from families that have no traces of such a case happening in the known family tree, are known to be unable to speak words, to ascend stairs on all fours, to smell every mouthful of food before

[1] Ananova News, "Baby with tail 'reincarnation of Hindu god'", 11:19 Friday 11th January 2002.

[2] The New England Journal of Medicine, 1982, article by Dr Fred Ledley.

[3] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 1 and chapter 5.

[4] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 5.

[5] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 2.

Chapter 5: Interrelation through Reversion

The previous chapter simply dealt with similarities which are found among the different species, and how they may demonstrate that one species is related to another. Though this may be some distance away from concrete evidence, it is always good to take it into consideration. In this chapter, I will examine evidence that leads me to thoroughly believe in the Derivative Theory, that mankind is little more than the an evolutionary conclusion of the ancient organisms that once lived on this planet, some of them still remaining. The evidence that I shall examine is in reversionary organs, known as "reversion" when they appear. When reversion occurs, it's when an organism is born, yet has an organ or a limb which serve it no purpose — though this organ is identical, in structure and muscle tissue, to the organs of certain lower animals, which today we are convinced are our ancestors. For instance, if a penguin was born with a plumage of feathers, this would be a perfect example. The question, though, is why would an organ of a distant relative finally reappear? As far as personal experience can verify, among humans, it is not unlikely for a person to retain their grandparent's attributes to a certain extent instead their direct parent's attributes. Similarly, I would not doubt it if someone were to testify to me that a family member had retained attributes particular to their a great grandparent. Yet, the further we go back in the family tree, it seems less and less likely that one of the old attributes will arise again. However, if Evolution is correct, then the further we go back in the family

book, but only to provide a sound foundation for the theory of Evolution.

With all that said, there is one particular form of Natural Selection that would seem particularly odd, if the world truly has a creator. In nature, there appears to be a form of Sexual Selection. Sexual Selection occurs when sex-related attributes of an organism are preserved through inheritance. By sex-related, I mean things that might reflect beauty, including ornaments and other aspects of an organism's physiology that would incline one person to think that it was not created, but came from a long line of successive progenitors. To quote Charles Darwin…

> There are many other structures and instincts which must have been developed through sexual selection- such as the weapons of offence and the means of defence- of the males for fighting with and driving away their rivals- their courage and pugnacity- their various ornaments- their contrivances for producing vocal or instrumental music- and their glands for emitting odours, most of these latter structures serving only to allure or excite the female. It is clear that these characters are the result of sexual and not of ordinary selection, since unarmed, unornamented, or unattractive males would succeed equally well in the battle for life and in leaving a numerous progeny, but for the presence of better endowed males.[1]

If it is true, that a creator created all of our organisms, I am quite curious: why has he implemented such strong, marked attributes for sex? After all, if there was such a creator, he could have created female animals to simply desire the strongest male for a mate. The vocal chords to produce music and sound, the glands for emitting odors, the physical ornaments used simply to arouse partners, all of

[1] The Descent of Man, by Charles Darwin, 1871, chapter 8.

these things could not have come about by simple natural selection, but rather, by a process known as sexual selection. (On a similar contradiction, why would a god ever create such strongly marked and powerful sexuality in organisms when, apparently, his followers consider the sex act to be obscene and blasphemous? Of course, I could use all the paper in the world if I wanted to discuss the problems of Christianity, but this is a book on Evolution.) With all this understood in good reason, I submit the observed form of Sexual Selection as an evidence that Natural Selection is effective in the wild and as an evidence that the organisms of the planet evolved, and were not created. Elsewhere, Darwin further describes other examples of Sexual Selection: "When we behold two males fighting for the possession of the female, or several male birds displaying their gorgeous plumage, and performing strange antics before an assembled body of females, we cannot doubt that, though led by instinct, they know what they are about, and consciously exert their mental and bodily powers."[2] and "…female birds in a state of nature, have by a long selection of the more attractive males, added to their beauty or other attractive qualities."[3] and still "The absence of bright tints or other ornaments may be the result of variations of the right kind never having occurred, or of the animals themselves having preferred plain black or white."[4] In a longer excerpt, Darwin describes the process of Sexual Selection…

> Sexual selection acts in a less rigorous manner than natural selection. The latter produces its effects by the life or death at all ages of the more or less successful individuals. Death, indeed, not rarely ensues from the conflicts of rival males. But generally the less successful male merely fails to obtain a female, or obtains a retarded and less vigorous female later in

[2] The Descent of Man, by Charles Darwin, 1871, chapter 8.
[3] The Descent of Man, by Charles Darwin, 1871, chapter 8.
[4] The Descent of Man, by Charles Darwin, 1871, chapter 8.

diseases, and to the attacks of allied parasites; our tastes in common for the same stimulants, and the similar effects produced by them, as well as by various drugs, and other such facts."[30] Finally, he writes: "Every evolutionist will admit that the five great vertebrate classes, namely, mammals, birds, reptiles, amphibians, and fishes, are descended from some one prototype; for they have much in common, especially during their embryonic state."[31]

[30] The Descent of Man, by Charles Darwin, 1871, chapter 6.
[31] The Descent of Man, by Charles Darwin, 1871, chapter 6.

that they are very well adaptated for scaling trees.[25] And, a quote by the father of Natural Selection…

> Thus we can understand how it has come to pass that man and all other vertebrate animals have been constructed on the same general model, why they pass through the same early stages of development, and why they retain certain rudiments in common.[26]

The similarities between organisms of this planet is undeniable. In fact, in the 1700's, Voltaire would write, "If I glance at the animal world, I find that all quadrupeds, and all wingless bipeds, reproduce their kind by the same process of copulation, and all the females are viviparous."[27] In his book The Descent of Man, Charles Darwin would offer more evidences on the similarities of all life forms. He would write, "Man is liable to numerous, slight, and diversified variations, which are induced by the same general causes, are governed and transmitted in accordance with the same general laws, as in the lower animals."[28] and also "His [mankind's] body is constructed on the same homological plan as that of other mammals. He passes through the same phases of embryological development. "[29] The reaction to drugs of mankind and animals is very similar, as Darwin describes: "I gave, as instances, our liability to the same

[25] Haeckel has an excellent discussion on the steps by which man became a biped: Naturliche Schopfungsgeschicte, 1868, s. 507. Dr. Buchner (Conferences sur la Theorie Darwinienne, 1869, p. 135) has given good cases of the use of the foot as a prehensile organ by man; and has also written on the manner of progression of the higher apes; see also Owen (Anatomy of Vertebrates, vol. iii., p. 71) on this latter subject.

[26] The Descent of Man, by Charles Darwin, 1871, chapter 1.

[27] "We Must Take Sides," by Voltaire, translated by Joseph McCabe. Quoted from "A Treatise on Toleration and Other Essays," Prometheus Books, 1994, page 10.

[28] The Descent of Man, by Charles Darwin, 1871, chapter 6.

[29] The Descent of Man, by Charles Darwin, 1871, chapter 6.

the season, or, if polygamous, obtains fewer females; so that they leave fewer, less vigorous, or no offspring. In regard to structures acquired through ordinary or natural selection, there is in most cases, as long as the conditions of life remain the same, a limit to the amount of advantageous modification in relation to certain special purposes; but in regard to structures adapted to make one male victorious over another, either in fighting or in charming the female, there is no definite limit to the amount of advantageous modification; so that as long as the proper variations arise the work of sexual selection will go on. This circumstance may partly account for the frequent and extraordinary amount of variability presented by secondary sexual characters. Nevertheless, natural selection will determine that such characters shall not be acquired by the victorious males, if they would be highly injurious, either by expending too much of their vital powers, or by exposing them to any great danger. The development, however, of certain structures- of the horns, for instance, in certain stags- has been carried to a wonderful extreme; and in some cases to an extreme which, as far as the general conditions of life are concerned, must be slightly injurious to the male. From this fact we learn that the advantages which favoured males derive from conquering other males in battle or courtship, and thus leaving a numerous progeny, are in the long run greater than those derived from rather more perfect adaptation to their conditions of life. We shall further see, and it could never have been anticipated, that the power to charm the female has sometimes been more

> important than the power to conquer other males in battle.[5]

In another proof of Sexual Selection, Darwin writes, "The wild-duck offers an analogous case, for the beautiful green speculum on the wings is common to both sexes, though duller and somewhat smaller in the female, and it is developed early in life, whilst the curled tail-feathers and other ornaments of the male are developed later."[6] and elsewhere: "The males have thus become provided with weapons for fighting with their rivals, with organs for discovering and securely holding the female, and for exciting or charming her."[7] Sexual Selection was the primary discussion of the book The Descent of Man, but Darwin did note on it in his earlier work…

> Amongst birds, the contest is often of a more peaceful character. All those who have attended to the subject, believe that there is the severest rivalry between the males of many species to attract, by singing, the females. The rock-thrush of Guiana, birds of paradise, and some others, congregate; and successive males display with the most elaborate care, and show off in the best manner, their gorgeous plumage; they likewise perform strange antics before the females, which, standing by as spectators, at last choose the most attractive partner. Those who have closely attended to birds in confinement well know that they often take individual preferences and dislikes: thus Sir R. Heron has described how a pied peacock was eminently attractive to all his hen birds. I cannot here enter on the necessary details; but if man can in a short time give beauty and an elegant carriage

[5] The Descent of Man, by Charles Darwin, 1871, chapter 8.
[6] The Descent of Man, by Charles Darwin, 1871, chapter 8.
[7] The Descent of Man, by Charles Darwin, 1871, chapter 8.

be, it is demonstrably true."[16] The processes of courtship to birth and nurturing the young are remarkably similar in humans as they are in the lowest of mammals.[17] For a human fetus, like the fetus of a primate, the heart is a simple pulsating vessel and the os coccyx (or "tail bone") extends beyond the legs of the fetus.[18] In embryos, certain glands, known as corpora Wolffiana, act similar to the kidneys of fish.[19] Bischoff says "that the convolutions of the brain in a human foetus at the end of the seventh month reach about the same stage of development as in a baboon when adult."[20] Professor Owen once remarked, "which forms the fulcrum when standing or walking, is perhaps the most characteristic peculiarity in the human structure";[21] yet Professor Wyman found "that the great toe was shorter than the others; and, instead of being parallel to them, projected at an angle from the side of the foot, thus corresponding with the permanent condition of this part in the Quadrumana."[22] In the fifth metatarsal of the foot, there is a muscle known as the ossis metatarsi quinti, and just as it is present in humans, it as also present in anthropomorphous apes.[23] Another similarity between humans and apes, to quote Charles Darwin, "Monkeys seize thin branches or ropes, with the thumb on one side and the fingers and palm on the other, in the same manner as we do. They can thus also lift rather large objects, such as the neck of a bottle, to their mouths."[24] Yet, for some races of mankind that are still living in what some would call "savagery," their feet are developed in a manner closer to other primates, in

[16] Man's Place in Nature, by Thomas Henry Huxley, 1863, p. 67.
[17] The Descent of Man, by Charles Darwin, 1871, chapter 1.
[18] Professor Wyman in Proceedings of the American Academy of Sciences, vol. iv., 1860, p. 17.
[19] Owen, Anatomy of Vertebrates, vol. i., p. 533.
[20] Die Grosshirnwindungen des Menschen 1868, s. 95.
[21] Anatomy of Vertebrates, vol. ii., p. 553.
[22] Proc. Soc. Nat. Hist., Boston, 1863, vol. ix., p. 185.
[23] Mr. Champneys in Journal of Anatomy and Physiology, May, 1872, p. 421.
[24] The Descent of Man, by Charles Darwin, 1871, chapter 2.

to his bantams, according to his standard of beauty, I can see no good reason to doubt that female birds, by selecting, during thousands of generations, the most melodious or beautiful males, according to their standard of beauty, might produce a marked effect. Some well-known laws, with respect to the plumage of male and female birds, in comparison with the plumage of the young, can partly be explained through the action of sexual selection on variations occurring at different ages, and transmitted to the males alone or to both sexes at corresponding ages…[8]

With all of the evidence of the natural world before us, I think it is admissible that the theory of Natural Selection is without a doubt true, and this lends a great amount of evidence to the theory of Evolution.

[8] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 4.

me a strong analogy between the same infection or contagion producing the same result, or one closely similar, in two distinct animals, and the testing of two distinct fluids by the same chemical reagent."[9] One Naturalist observed that monkeys are liable to the same noninfective disease as humans are, such as apoplexy, inflammation of the bowels, and cataract in the eye.[10] Monkeys are also known to have a strong taste for coffee, tea, and nicotine, as they have been observed to smoke cigarettes.[11] One Naturalist observed how an African tribe captures wild baboons, by leaving out strong beer and capturing them while they are inebriated. The following morning, they are sick, and turn away in disgust when offered more beer, something not uncommon to humans.[12] Darwin once remarked, "An American monkey, an Ateles, after getting drunk on brandy, would never touch it again, and thus was wiser than many men."[13] Parasites, both internal and external, which infect mankind are known to also infect other mammals.[14] When mankind is wounded, his wounds are healed in the same manner as other organisms, even when compared to such a low life form such as insects.[15] The hands and the feet of humans, when in the womb, are the same form as other lower organisms when early in development, and to quote Professor Thomas Henry Huxley, "quite in the later stages of development that the young human being presents marked differences from the young ape, while the latter departs as much from the dog in its developments, as the man does. Startling as this last assertion may appear to

[9] The Descent of Man, by Charles Darwin, 1871, chapter 1.

[10] Naturgeschichte der Saugethiere von Paraguay, 1830, s. 50.

[11] The Descent of Man, by Charles Darwin, 1871, chapter 1.

[12] Brehm, Illustriertes Thierleben, B. i., 1864, 75, 86. On the Ateles, s. 105. For other analogous statements, see ss. 25, 107.

[13] The Descent of Man, by Charles Darwin, 1871, chapter 1.

[14] Dr. W. Lauder Lindsay, Edinburgh Veterinary Review, July, 1858, p. 13.

[15] Variation of Animals and Plants under Domestication, by Charles Darwin, vol. ii., p. 15.

Chapter 4: Interrelation through Similarity

One of the reasons to believe about the interrelation of all species is the astounding amount of similarities between them all, which this chapter will be devoted to. By drawing comparisons between different forms of life, I hope to shine light on to the idea that such similarities could not have come about except with a direct interrelation between the species.

As Naturalists study the environment and try to classify different organisms into different categories, such as family, species, race, they are often met with problems. For instance, there are 182 British plants which are regarded as varieties of another species, and one Naturalist makes the claim that there are 251 forms which are varieties of another species, while another claims that there are only 112 forms which are varieties of another species — these "doubtful forms" (as they may be called) are so closely related to their common progenitor, with only slight and varying differences, that they have baffled scientists as to whether they are their own species are related to another species.[1] Several ornithologists believe that the British red grouse is a race of the Norwegian species while another believe it is related to a species peculiar to Britain.[2] One German author has found twelve distinct varieties of the common Oak tree, which other Naturalists have classified as distinct species.[3] The Naturalist Alphonse De Condolle examined

[1] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 2.
[2] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 2.
[3] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 2.

600 species of Oak trees, and concluded that only 200 of them actually fit the description of the term "species."[4] To quote Darwin, "How many of the birds and insects in North America and Europe, which differ very slightly from each other, have been ranked by one eminent naturalist as undoubted species, and by another as varieties, or, as they are often called, geographical races!"[5] Mr. G. H. Lewes remarks…

> [The tadpole of the common salamander or water-newt] has gills, and passes its existence in the water; but the Salamandra atra, which lives high up among the mountains, brings forth its young full-formed. This animal never lives in the water. Yet if we open a gravid female, we find tadpoles inside her with exquisitely feathered gills; and when placed in water they swim about like the tadpoles of the water-newt. Obviously this aquatic organisation has no reference to the future life of the animal, nor has it any adaptation to its embryonic condition; it has solely reference to ancestral adaptations, it repeats a phase in the development of its progenitors.[6]

In mankind, the muscles, bones, and even the brain is constructed the same as it is in the lower animals.[7] Just as mankind can become infected with hydrophobia, variola, the glanders, syphilis, cholera, herpes, among others, so can other lower animals, just as the medicines on humans have a similar effect on the lower creatures.[8] To quote Darwin, "There appears to

[4] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 2.
[5] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 2.
[6] Origin of the Species, by Charles Darwin, 1859, Sixth Edition, chapter 14.
[7] Grosshirnwindungen des Menschen, 1868, s. 96.
[8] Dr. W. Lauder Lindsay has treated this subject at some length in the Journal of Mental Science, July, 1871: and in the Edinburgh Veterinary Review, July, 1858.