

## CHARLES DARWIN ON "LAWS OF GROWTH"

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### ABSTRACT

Although Charles Darwin is credited with having recognized natural selection as the fundamental process accounting for the evolutionary change and adaptation of organisms, it is not generally recognized that this is not Darwin's true position. A series of quotations from Darwin's books and his posthumously published letters are presented. These illustrate that on a number of occasions Darwin recognized "laws of growth" as being a more important evolutionary process than natural selection.

**Keywords:** Darwin, evolutionary processes, laws of growth, natural selection.

1. 1860: "On the Origin of Species by means of natural selection", 5th thousand.

p. 205: "We are far too ignorant, in almost every case, to be enabled to assert that any part or organ is so unimportant for the welfare of a species, that modifications in its structure could not have been slowly accumulated by means of natural selection. But we may confidently believe that many modifications, wholly due to laws of growth, and at first in no way advantageous to a species, have been subsequently taken advantage of by the still further modified descendants of this species."

2. 1872: "On the Origin of Species by means of natural selection". 6th Edition.

p. 157-158: "...we may easily err in attributing importance to characters, and in believing that they have been developed through natural selection. We must by no means overlook the effects...of the complex laws of growth, such as correlation, compensation, of the pressure of one part on another....But structures thus indirectly gained, although at first of no advantage to a species, may subsequently have been taken advantage of by modified descendants, under new conditions of life and newly acquired habits."

p. 173: "Now although natural selection may well have had the power to prevent some of the flowers from expanding, and to reduce the amount of pollen, when rendered by the closure of the flowers superfluous, yet hardly any of the above special modifications can have been thus determined, but must have followed from the laws of growth, including the functional inactivity of parts, during the progress of the reduction of the pollen and the closure of the flowers."

It is so necessary to appreciate the important effects of the laws of growth..."

p. 174: "In numerous other cases we find modifications of structure, which are considered by botanists to be generally of a highly important nature, affecting only some of the flowers on the same plant, or occurring on distinct plants, which grow close together under the same conditions. As these variations seem of no special use to the plants, they cannot have been influenced by natural selection."

p.175: "We thus see that with plants many morphological changes may be attributed to the laws of growth and the interaction of parts, independently of natural selection."

3. 1903: More letters of Charles Darwin, Vol 1, from a letter of 1860.

p. 144-145: "...do you really suppose that for instance Diatomaceae were created beautiful that man, after millions of generations, should admire them through the microscope? I should attribute most of such structures to quite unknown laws of growth;...When any structure is of use..., I can see with my prejudiced eyes no limit to the perfection of the coadaptations which could be effected by Natural Selection."

4. 1903: More letters of Charles Darwin, Vol 1. Letter to A. Hyatt, prominent American neo-Lamarckian, dated 1872.

p. 343: "I should be inclined to attribute the character in both your cases to the laws of growth and descent, secondarily to Natural Selection. It has been an error on my part, and a misfortune to me, that I did not largely discuss what I mean by laws of growth at an early period in some of my books. I have said something on this head in two new chapters in the last edition of the *Origin*\* ....Endless other changes of structure in successive species may, I believe be accounted for by various complex laws of growth. Now, any change of character thus induced with advancing years in the individual might easily be inherited at an earlier age than that at which it first supervened, and thus become characteristic of the mature species; or again, such changes would be apt to follow from variation, independently of inheritance, under proper conditions. Therefore I should expect that characters of this kind would often appear in later-formed species without the aid of Natural Selection, or with its aid if the characters were of any advantage."

p. 344: "Before I had read your final remarks, I thought also that unfavourable conditions might cause through the law of growth, aided perhaps by reversion, degradation of character. No doubt many new laws remain to be discovered. Permit me to add that I have never been so foolish as to imagine that I have succeeded in doing more than to lay down some of the broad outlines of the origin of species."

5. 1888: The Descent of Man and Selection in relation to sex. 2nd Edition.

p. 61: "... I now admit...that in the earlier editions of my 'Origin of Species' I perhaps attributed too much to the action of natural selection or the survival of the fittest. I have altered the fifth edition of the 'Origin' so as to confine my remarks to adaptive changes of structure; but I am convinced, from the light gained during even the last few years that very many structures which now appear to us useless, will hereafter be proved to be useful, and will therefore come within the range of natural selection....I did not formerly consider sufficiently the existence of structures, which, as far as we can at present judge, are neither beneficial nor injurious and this I believe to be one of the greatest oversights as yet detected in my work. I may be permitted to say, as some excuse, that I had two distinct objects in view; firstly, to show that species had not been separately created, and secondly, that natural selection had been the chief agent of change, though largely aided by the inherited effects of habit, and slightly by the direct action of the surrounding conditions. I was not, however, able to annul the influence of my former belief, then almost universal, that each species had been purposely created; and this led to my tacit assumption that every detail of structure, excepting rudiments, was of some special, though unrecognised, service. Anyone with this assumption in his mind would naturally extend too far the action of natural selection, either during past or present times."

\* i.e. the 6th edition of 1872, in the new chapter entitled "Miscellaneous objections to the theory of Natural Selection".