

THE OHIO JOURNAL OF SCIENCE

VOL. XXXVI

SEPTEMBER, 1936

No. 5

THE RÔLE OF FITNESS IN EVOLUTION

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Fitness, though so frequently referred to by selectionists, and a term of so much importance in their theory, nevertheless lacks definite meaning. Referring to ability to survive, its only proof under the theory is survival. This has been pointed out by various authors among whom we may quote Lloyd, "Fitness is not a reality in itself, it is only a term used to express the fact of survival." (8, 180.)

Those accustomed to look the least below the surface cannot accept this illogicality. They can, moreover, readily point out its falsity. Does not a forest fire, a flood, any sudden and overwhelming catastrophe, take lives without regard to individual qualifications? Many of the creatures destroyed must have been fit, in any reasonable sense of the word, but they did not survive.

The same thing is obvious in the case of mass eliminations by year classes among fishes, oysters, and coniferous seeds, for example. When all are eliminated the reason cannot be unfitness; and this is true also of the normal going under of a very high percentage of the individuals of any organism having large numbers of young. When 99% or more of the individuals are eliminated all cannot be unfit.

Fitness as the sole reason for survival and survival as the sole evidence of fitness are fruits of a type of philosophy that surely has run its course. If there is nothing of more real worth in the doctrine of the "survival of the fittest," the sooner it is abandoned, the better.

The selectionist idea of fitness being an impossible one, let us consider what is ordinarily meant by the term. Does it not merely mean apparent health as evidenced by good appearance, alertness, and vivacity? Is it not based on such qualifications as sound bodily condition, tissue tone, and good co-ordination?

Further, are not all these things largely of individual development?

INDIVIDUAL DEVELOPMENT OF FITNESS

The almost universal practice of athletics by those whose vocation does not involve sufficient bodily activity is acknowledgment by the human race that fitness must be individually acquired and maintained. The pitiful lack of development of children who have been closely confined is sad evidence on the negative side.

Breeders of animals know that if the young are not adequately fed and exercised and kept steadily progressing throughout the formative period they will never attain normal size and development.

The conditions of captivity profoundly affect animals and rearing in confinement prevents development of the fitness we observe in wild individuals of the same species. As to game birds an authority says:

"No birds that are kept in captivity and hand-fed are as sporty to shoot, or have the same flavor when eaten, as birds either raised in the wild state or put out at an early age to rustle for themselves. Birds liberated young soon become strong on the wing, and assimilate the craft of their forbears. The wild feed they subsist on, in addition to the planted grain, actually gives them a wild flavor when eaten. Thus, in a few weeks, they practically assume the status of wild birds. On the other hand, birds reared in captivity and placed in the coverts at maturity, and probably at the most not more than a week or two before they are shot, lack the above characteristics to a great extent, although the loss will be much less. They will probably be fatter, and therefore slower on the wing for this reason, as well as because of lack of exercise. In the case of pheasants, they are apt to run more, and not rise with the snap that characterizes the wild bird. Quail also act sluggish, and I have seen covies sneaking along through the grass, loath to rise until actually put up." (Smith, 10, 21-22.)

The differences in captive bred animals may extend even to deep-seated structural characters as those of the skeleton. For instance, Hollister shows that in captive lions "Changes in the skull which would be accepted as of 'specific' or possibly of 'generic' value in wild animals from different regions are thus produced in the life of a single individual." (7, 190.)

The following frequently quoted instance is of interest in this connection. "Some of our countrymen [Englishmen] engaged about the year 1825, in conducting one of the principal mining associations in Mexico, that of Real de Monte, carried out with them some English greyhounds of the best breed, to hunt the hares which abound in that country. * * * the scene of sport is at an elevation of about 9,000 feet above the level of the sea, and the mercury in the barometer stands habitually at the height of about 19 inches. It was found that the greyhounds could not support the fatigues of a long chase in this attenuated atmosphere, and before they could come up with their prey, they lay down gasping for breath; but these animals have produced whelps which have grown up, and are not in the least degree incommoded by want of density in the air, but run down the hares with as much ease as the fleetest of their race in this country." (Lyell, 9, 2, 297.)

We see in such cases the effect of environment and of the activities of the animal in the environment. We see that inheritance does not rule, that organisms will not develop their normal characteristics unless normally environed and exercised. We therefore conclude that fitness which above all things is of individual acquisition, is not inherited. Further testimony to this effect is given in the following section.

FITNESS NOT INHERITED

In sexually propagated organisms, all individual qualifications have to be developed from the egg anew. There is no direct transmission of them from adult to adult. As Hogben states the case for the human race, "Our parents do not endow us with characters. They endow us with genes." (6, 11.)

Further comment by authors along this line are quoted here.

"It is certain that in the past we have too readily assumed that characters which appear in successive generations are transmitted by heredity, and we have given too little attention to the possibility of their being acquired independently by each generation." (Conn, 3, 357.)

"Many characters of adult organisms consist in part of a genetic or hereditary contribution, which might be called a qualitative element, to which is added during growth a quantitative reaction to more or less favorable conditions, depending not only upon external circumstances but also upon the perfection and efficiency of the remainder of the organism." (Cook, 4, 255.)

“Individuals having the same hereditary composition may show very diverse characteristics in different environments.” (Coe, 2, 111.)

“That many individuals of the species are distinctly ill adapted to their environment is a common observation, but this usually results from the failure of the individual to realize the full advantage of his heritage.” (Coe, 2, 112.)

“An organism’s qualities, characters, are the result of its development, as such they cannot be said to be inherited.” (Hagedoorn, 5, 11.)

“It cannot be emphasized too strongly that the individual as we know him at any moment is the resultant of the hereditary qualities he possesses as developed by the particular environment in which he has lived.” (Thompson, 11, 338.)

“Heredity does not account for the individual, but merely for the potentialities some of which are realized in the individual. In other words, the internal and transmitted factors are by themselves unable to ‘produce’ an animal at all. The same point of view has been developed by Goodrich, who stresses the distinction which has to be drawn between the process of transmission of the internal factors from parent to offspring, and the process of production in the offspring of characters similar to those which were possessed by the parent. ‘An organism is moulded as the result of the interaction between the conditions or stimuli which make up its environment and the factors of inheritance. No single part is completely acquired, or due to inheritance alone. Characters are due to responses and have to be made anew at every generation.’ Similar views have been expressed by Conklin.” (de Beer, 1, 14-15.)

CONCLUSION

Instead of organisms living longest because they are fittest it is apparent that they may develop more and more fitness the longer they live (senile deterioration excepted). Fitness is distinctly a qualification that must be individually acquired, and is only fully developed by normal activity in a normal environment. It is not inherited nor can it be transmitted. Under this view it loses most of its importance for the theory of natural selection. The “survival of the fittest” is of no moment if fitness is not inherited.

Since the germinal constitution is probably not defective in the bulk of a population, it follows that almost any individuals of average fitness (capable of conjugation) would serve equally well as progenitors of the race. Since as a rule such ordinary individuals do in fact survive and reproduce their kind we must conclude that the role of the "fittest" in the organic world is not at all that attributed to it by the theory of "natural selection."

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