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ARTICLE VI.

FALSE BIOLOGY AND FATALISM.¹

BY THE REVEREND JOHN T. GULICK, SC.D.

HONOLULU, T. H.

HERBERT SPENCER rests his denial of the freedom of the human will on the biological assumption that all vital activities are predetermined by activities in the environment.² In his "Principles of Biology," sections 169 and 170, we read: "At first, changes in the amounts and combinations of external inorganic forces, astronomic, geologic, and meteorologic were the only causes of the successive changes undergone by organisms. In time, however, the action of organisms on one another became new sources of organic modifications." And again: "That there may be continuous changes in organism, there must be continuous changes in incident forces."

It is evident that if our natural powers and our present conditions are so determined by the environment that we can produce but one set of actions, then no effort on our part, either individual or collective, can in the least affect the result; for we cannot change our circumstances without acting, and our actions are already determined by our circumstances.

We now raise the question, whether the assumption on which Herbert Spencer founds his philosophy, and which has been accepted without question by many biologists, is in accord with the facts of biology.

¹ Reprinted from the *Friend* (Honolulu, T. H.), June and August, 1907.

² *Principles of Psychology*, sect. 220.

Is it true that change in the character of the selection affecting any organic group is wholly determined by change in the activities surrounding the group? Or can change in the selection be initiated and maintained through change in the organism, without any change in the environment?

External nature furnishes the means and the occasions but not the cause. Can anything be surer than that through the activities of the organism changes in its relations to the environment are often produced; and that through these changes the character of its survival is changed, and so the character of its selection? It is by virtue of its power to strive for the continuance of its life that an organism is an organism; and selection is the direct result of varying degrees of survival in the exercise of this power. We see, therefore, that the doctrine, common amongst a certain class of evolutionists, that the environment makes the organism, rests on a false assumption. One cause of this assumption has been the habit of speaking of the transforming power of selection as if it were quite distinct from the power of variation; whereas the diversity of survival, which is diversity of selection, is the direct result of the varying adaptation of the organism. The transforming power of selection is the direct result of variation and heredity, with the elimination of the less fit.

If we wish to draw a true parallel between Natural Selection and Artificial (or rational) Selection, we must consider both wild and domestic creatures as gaining opportunity for propagation by adapting themselves to the environment, the one class varying so as to be the best able to perpetuate its kind in the struggle for life among irrational creatures that are the environment, and the other class varying so as to be the most pleasing to man, and through his care and protection gaining a chance to live and propagate. The one class adapt

themselves to the natural (or irrational) environment, the other to the rational environment. *In either case change in the character of the selection may be produced through change in the organism, without any change in the environment.*

I will now refer to cases that illustrate and prove this statement.

It should be noted that Natural Selection and Sexual Selection—the two forms of selection discussed by Darwin—belong to widely different spheres of action, and, as I have elsewhere shown, there are other forms of selection of equal importance with these, arising in each of these spheres. Natural Selection is one form of Environal Selection, the changes of which are determined by changes in the natural environment. Another form of Environal Selection is Artificial Selection, the changes of which are determined by changes in the rational environment surrounding the species. A third form of Environal Selection is what I have called *Endonomic Selection*, diverse forms of which are determined by different methods of using the same environment adopted by isolated branches of the same species.

The valleys of Manoa and Nuuanu, on the island of Oahu, near Honolulu, though only about three miles apart, present a greater difference in vegetation than that found between Manoa and Kawaihoa (in the district of Waialua), which are twenty miles apart; but the divergence in the species of snails of the genus *Achatinella* occupying these valleys varies according to the number of ridges by which they are separated, and not according to the conditions to which they are exposed. The largest species of the genus are found in the adjoining valleys of Manoa and Makiki clinging to the trunks of the ohia and kukui trees while their nearest of kin in Waialua are much smaller, are of different forms and colors, and have

deserted the trunks of the larger trees to live on the lobelia and other shrubs.

Several species of birds found in North America have changed, or are now in the process of changing, their relations to the environment in such a way as to introduce themselves to new forms of selection. One is the cliff swallow, which, instead of plastering its nest against the roof of a cave or hole in a cliff, attaches it to the overhanging eaves of a house. Another is the chimney swift. We know that before the coming of Europeans these birds chose hollow trees as the appropriate places for their nests, but now most of the species have deserted the hollow trees, and established themselves in the chimneys.

The influence of habits in determining new relations to the environment is well illustrated by a colony of cats on Tarpon Island, near the mouth of the Mississippi River. One of the most decided instincts of the ordinary cat is to avoid immersion in water or any other liquid. He dislikes to wet even his feet; but there may arise conditions under which he will use his paws in drawing food out of the water. More than one has learned to help himself to cream placed in an open jar, by thrusting his paw into the liquid and then licking off what adheres. Some have learned to skim pans of milk in a similar way, and others have become adepts in fishing for gold fish kept in glass globes. These undoubted examples of the partial overcoming of their natural aversion make it easier to believe the account given by the New Orleans *Times-Democrat* concerning the Tarpon Island cats. Their separation from other families of cats has allowed of their establishing their habits of feeding on entirely new lines of tradition, for they all wade freely in the shallow waters of the beach hunting for small fish, and three or four of the bolder ones

swim off to oyster boats lying at anchor near by. This is an example of an innovation becoming a permanent habitude; and, as Captain Bosco, who owns these cats, says it is many years since they began to go into the water, we have reason to believe that a coincident form of Endonomic Selection has begun to produce a breed whose innate instincts are better adapted to this mode of life than were those of the original stock.

Returning to Sexual Selection, we find that it is one of several forms of selection arising from the relations in which the members of the same species stand to each other and which may, therefore, be classed as forms of Reflexive Selection. Sexual Selection secures between the sexual instincts of one sex and the instincts and characters of the other sex such harmony as is necessary for the sexual propagation of the group. Social Selection maintains such social instincts and related characters as are necessary for the prosperity of the group. Social habits in a great measure determine the food and clothing of a community, and thus deeply affect the conditions of survival. The degree of exposure to which the young are habitually subjected is also largely determined by social custom, and so the innate endowments of those that survive. In many beasts and birds recognition marks are of great importance; and the disadvantage coming to those deficient in these characters results in Social Selection.

A third form of Reflexive Selection is what I have called *Filio-parental Selection*, which maintains coördination between the powers and characters of parents, and the size, number, form, and instincts of the young. How the power of giving suck and the corresponding instinct for sucking were first developed it may be impossible to tell; but it is evident that, having once been established as the method of

sustentation for the young of mammals, any mother lacking the power of giving suck, and any young lacking the instinct for sucking, would in all probability fail of leaving descent. The death at birth of children with excessively large heads, as also the failure of a mother with a contracted pelvis to produce living children, are examples of filio-parental selection.

There are several other forms of Reflexive Selection, but the only one that we can take time to consider is *Institutional Selection*. Institutional Selection is due to the suppression of human reproduction in certain cases, and the favoring of it in other cases, by means of ecclesiastical, military, commercial, sanitary, and penal institutions. It is of great interest to the student of social problems, for it shows how even the inherited powers of the civilized races of mankind are being constantly molded by their institutions, and the forms of social organization that prevail.

In all divergent evolution of racial characters, segregate generation (that is, the generation of like with like) has been a fundamental condition. It is also at present a fundamental condition in the very structure of the organic world; for without Segregate Generation, races, species, genera, and the higher groups could not continue to exist: even if they were independently created.

In every case where a sexually propagating species becomes divided into several distinct races, we find isolation (i. e. the prevention of free crossing) between the races, with inter-generation within each race, and each race showing separate powers of variation and heredity. This initial segregation having once been established, intensive segregation is sure to be introduced and carried forward from generation to generation, even when the conditions lying outside of each group are the same; for the isolated groups will in time adopt different

methods of using the environment, and so subject themselves to different forms of selection. Divergent forms of Reflexive Selection will also arise bringing intensified segregation and increasing divergence in the characters of each group.

We will now briefly consider the evolution of acquired characters; and, for the sake of brevity, I will at the same time refer to some of the ways in which these acquired characters, with their organized habitudes and customs, become controlling factors in the racial evolution of the same groups. But, that there may be no misapprehension, I wish to have it carefully noted that the influence of acquired characters which I am here considering is entirely independent of any direct modification of inheritance in the young through acquired characters gained by the continued practice of the parents. Whether there is any such direct influence has long been discussed, and the prevailing opinion is that it has been disproved; but, whatever the truth on that point may be, the influence of acquired characters, through their control of the forms of selection, must be recognized as of commanding importance in many of the higher animals and especially in man. This influence operates: (1) by partially setting aside a form of selection; (2) by wholly setting aside some form of selection; or (3) by establishing a new form. Acquired characters by partially setting aside a form of selection arising from changes that would otherwise limit the range of the species, may give time for many generations to arise with successive variations that in their turn more or less fully meet the new conditions, and thus lead to a new form of Natural Selection, and the establishing of a new race.

As an illustration let us consider the case of the Eskimo race of the Arctic regions. If we could follow their ancestry back to remote ages, there is every reason to believe that we

should find a stage in which they were naked savages, living in a warm climate, with but little knowledge of houses, clothing, or fire. It may be a matter of debate whether they reached the northern regions in a period when the climate was a continuous summer, or whether their approach required an increasing fight with cold weather as they went north; but, in either case, they could not have established themselves in these regions where they now are, without the several arts by which man protects himself from the cold. It is therefore evident that these arts were part of the equipment that has enabled them to remain for countless generations in these cold regions, till their inherited constitution has become very different from that of tropical man. F. A. Cook, ethnologist of the first Peary North Greenland Expedition, writing of the Eskimo, states that "the muscular outlines of the body are nearly obliterated from the fact that they have immediately beneath the skin a layer of blubber, or areolar tissue, which protects them against extreme cold."¹

We find that accommodation with habitudinal segregation fills a sphere of importance in the evolution of animals according to the degree of their mental endowments. In studying the evolution of the higher animals it is, therefore, necessary to consider the molding of accommodations by election as well as the molding of adaptations by selection.

In the case of the Eskimo we have an illustration of the setting aside, or prevention, of Natural Selection sufficient to preserve the group from destruction; for Natural Selection in such a case is the elimination of the unfit, and as none were capable of surviving without the aid of clothing and houses, Natural Selection unchecked by these arts would have been the elimination of all. The prevention of Natural Selection

¹ Quoted in Wright and Upham's *Greenland Icefields*, p. 136.

was, however, not complete; and in the end we find a race of men with innate characters protecting them in a considerable degree from the destructive effects of the low temperature.

Let us now consider cases in which Natural Selection in regard to certain endowments has been entirely set aside by acquired characters; and other cases in which new forms of selection have, at the same time, been introduced. From the time of the earliest mammals till very recent times every mammalian mother that failed to give milk to her young also failed of raising her young, and the propagation of a stock seriously deficient in this respect was prevented by Filio-parental Selection. Amongst human mothers there are, however, a few who are deficient in the power of giving suck, and, in civilized races, the provision for the young of such mothers is so complete that they are placed at no disadvantage. There is, therefore, reason to believe that the power of mothers to give suck is being gradually diminished by the setting aside of this long-established form of Filio-parental Selection. We may even begin to wonder whether this is not the first step toward the production of a variety of the human species in which this power will be comparatively obsolete.

Another example of a similar kind is the deterioration of the power of sight in the more civilized races of man. I believe it is fully recognized that the proportion of individuals with defective sight is much greater in civilized than in savage races.

Is there any reason to doubt that the difference is due to the fact, that, for many generations, savages with deficient sight have had less opportunity for leaving descendants, than have individuals with the same deficiency belonging to civilized races?

Degeneration of important powers has also occurred in many animals that have become parasitic, or have learned to

shift the responsibility of raising their young onto other species. The old-world cuckoo has entirely lost the instincts that would lead it to build its own nests and hatch its own eggs. In the eastern part of the United States of America the black-billed cuckoo and the yellow-billed cuckoo have started on a course that will probably lead to the extinction of both species, unless they succeed in finding some alien species on which the labor of raising their young may be imposed. There are now shirking individuals who lay their eggs in the nests of other birds, either of their own species or of the allied species, and thus the instinct for faithful service is being lowered from generation to generation.

When public attention has been turned to the danger of degeneration that threatens mankind through the setting aside of certain forms of long-established selection, the remedy will not be found in restoring the conditions of savage life, in which the deaf and the blind are eliminated by starvation; but rather by establishing new forms of institutional and prudential selection. The marriage of those who are specially liable to have defective offspring may thus be prevented.¹

The illustrations I have presented, show conclusively that in many ways old forms of selection may be set aside and new forms introduced, without reference to any change in the activities outside of the species. If even the snails are capable of dealing with the same environment in different ways, how much more may we expect of mankind? The voices of science, of philosophy, and of religion, appeal to us both as individuals and as communities, saying, in the words of Paul, "Work out your own salvation with fear and trembling; for it is God that worketh in you."

¹The influence of acquired habits on the inherited characters of a group is fully discussed in my work on "Evolution, Racial and Habitudinal," published by the Carnegie Institute of Washington.