

species; while with complete isolation more or less divergence may result before diversity of selection comes in to intensify the segregation.

Of selection I also discover many reflexive forms due to the influence of members of the same species upon each other, as well as natural selection and artificial selection due to influences lying outside of the species.

In considering the factors producing different inheritable types of related organisms we have to distinguish between the factors dividing the original stock into separate inter-generating groups and those producing diversity of inherited character in the separate groups. The former process we may call racial demarcation through isolation, and the latter racial intensification through survival resulting in selection. Isolation and selection we find to be cooperating factors in controlling racial segregation.

Our investigation of the factors producing evolution will, however, remain very incomplete unless we study the influences producing different social groups, in which different habits of dealing with the environment are originated and maintained, not by variation and heredity, but by innovation and tradition. Here again we must distinguish between the influences dividing the original group into separately associating groups, and those that establish a diversity of habits and acquired characters in the separate groups. The former process we may call habitual demarcation through partition and the latter habitual intensification through success resulting in election. Partition and election we find to be cooperating factors in controlling habitual segregation.

In the bionomic history of many species the great significance of habitual segregation is found in the fact that it is the forerunner of racial segregation.

For illustrations of the influence of habitual segregation on racial segregation I would refer to my work on evolution published by the Carnegie Institution.

JOHN T. GULICK.

OAKLAND, CAL.

SALMON HYBRIDS.

TO THE EDITOR OF SCIENCE: I have received from Mr. C. W. Dorr, of the Alaska Packers' Association, certain notes by Mr. J. A. Richardson on experiments in hybridization of salmon, undertaken in the hatchery at Karluk, Alaska. These will be of interest to zoologists.

DAVID STARR JORDAN.

Mr. Richardson writes as follows:

Crosses have been made of all of the salmon family except the steelhead. These experiments have been made for the novelty of it. The peculiarities of each are invariably the same from year to year, and practically none of the fry survive.

The cross between the red salmon and king salmon produces a very queer lot. Out of many thousand eggs hatched, ninety per cent. of the fry will have no eyes; the nose is long and pointed; the sac is of very light color and quite watery in appearance. Only two per cent. or three per cent. are reasonably well formed fish, and the most of these die.

The number of eggs which fertilize is about normal, but it is noticed that a larger number than usual of the white eggs removed from the baskets contain embryos that have ceased to develop. This cross has been made both ways.

It has been demonstrated that the cross between the red salmon male and the humpback female is very superior to other crosses—so much so that it leads to the belief that there is closer relationship between these two species of the salmon family. An extended experiment by crossing these two species is now being carried on. The loss of eggs and fry is being counted and notice taken of general conditions. We have fine specimens from the season 1904 (eggs taken in 1903) of this cross. They are about eight months old, two inches long, and bright, clean, silvery fish, rather long and slim.

SPECIAL ARTICLES.

AN INTERESTING DISCOVERY OF HUMAN IMPLEMENTS IN AN ABANDONED RIVER CHANNEL IN SOUTHERN OREGON.

DURING July and August, 1905, the writer was in the field in southern Oregon under the