

Not all degenerative change is, of course, non-adaptive. Frequently, structures of adaptive significance arise in this way, as when the anterior segments of the polychaete fused to form the arthropod head.

Under normal conditions natural selection confines degenerative changes to minor body features, as details of sculpture or color pattern, but under abnormal conditions more profound changes are likely to occur. Cave conditions, as Wright himself mentions, are a case in point. In a normal environment selection tends to keep up to par the light receptive and light protective mechanisms, *i.e.*, the visual and pigmentation systems. In caves, on the other hand, such factors are relaxed so that these systems degenerate. Tactile organs, however, such as antennae and long body-setae, are encouraged, at least in the ground beetles, so that these structures thrive and are maintained in a high degree of development. Similarly explained are the degenerative changes that occur in sedentary and parasitic animals in general and the occasional loss of wings by birds and insects in certain insular environments. Darwin took account of the more extreme of these degenerative changes under the heading of the effect of disuse. But we have long realized that "disuse" in itself has no influence on the hereditary mechanism. It is merely evidence that the parts in question are no longer useful to the organism. They are, accordingly, no longer maintained by natural selection and so are subject to degenerative modification.

The picture that we get of evolution is somewhat as follows: Mutations constitute the basic material. The upbuilding of the complexity of organic function and structure and the thoroughgoing adaptation that all organisms exhibit are the product of natural selection. The detailed specific and generic differences are largely the result of differential mutational effects in partially or completely isolated populations. Selection effects a continuous influence, keeping the organism and its parts up to a certain par and preserving characters of adaptive significance as they occur. There are, however, always important portions of every organism over which selection effects no influence, and these are subject to degenerative changes in accordance with the principle that the loss of genes is more frequent than their gain. Still unexplained, perhaps, are certain so-called orthogenetic changes, like the suture system of ammonites, but the principle of degenerative evolution in the absence of continued selective control seems to be an important factor in understanding plant and animal diversity.

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LINNÆUS ON THE NATURAL HISTORY OF MAN

DR. HRDLIČKA's communication in *SCIENCE* for December 27, 1940, containing a passage from a letter written by Linnæus in 1747 on the similarity of man and the apes reminded me of a note I made a few years ago in reading Linnæus' "Tour in Lapland." In his journal of this tour, under date of July 11, 1732, Linnæus wrote, "If we contemplate the characters of our teeth, hands, fingers, and toes, it is impossible not to perceive how very nearly we are related to Baboons and Monkeys, the wild men of the woods." Thus we find Linnæus at the age of twenty-five and nearly fifteen years before his letter of February 14, 1747, to Gmelin, perceiving a close relationship between man and the monkeys. My quotation is from page 331 of the first volume of "*Lachesis Lapponica*, or A Tour in Lapland, Now First Published from the Original Manuscript Journal of the Celebrated Linnæus; by James Edward Smith, M.D., F.R.S., President of the Linnæan Society" (London, 1811). The editor's preface says that the original was written in Swedish intermixed with Latin, that a literal translation of the Swedish was made by "Mr. Charles Troilius, a young gentleman in the mercantile line, resident in London," and that he himself put the matter into its final English form. Though we have no assurance of the absolute literalness of the translation of the particular sentence I have quoted, there seems to be no reason to doubt that it expresses fairly what Linnæus wrote in his journal.

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THE SOYBEAN IN CHINA

In your issue of January 24, 1941 (Vol. 93, No. 2404), in a report on "the soybean crop in the United States" by A. W. von Struve, I find the assertion: "The first record of the plant is in the writings of Emperor Shang Nung of China in 2838 B.C."

Elmer D. Merrill and Egbert H. Walker ("Bibliography of Eastern Asiatic Botany," 1938, p. 556) call Shên-nung (not Shang Nung) "an early mythical Chinese ruler," H. A. Giles ("Chinese Biographical Dictionary," 1898, No. 1,695) "a legendary emperor," and B. Laufer, more correctly ("Beginnings of Porcelain," 1917, p. 160) "the culture hero, who, as implied by his name, 'Divine Husbandman,' was regarded as the father of agriculture and discoverer of the healing properties of plants."

No one knows just when the herbal attributed to him was compiled, but it probably was not before the Christian era. Philip K. Reynolds and Mrs. C. Y. Fang (*Harvard Journal of Asiatic Studies*, V, 2, June,