brought into expression. The Mendelian hypothesis of alternative transmission involves the idea of exclusion, of the formation of germ-cells which are "pure," in the sense that the protoplasmic rudiments of some of the parental characters are supposed to be omitted from some of the germ-cells. For the existence of such incomplete germ-cells only arithmetical reasons have been advanced.

If Mendel could have read the works of Darwin the hypothesis of *alternative transmission* might have been spared. His facts could have been associated with the many other instances of *alternative expression* enumerated by Darwin. Mendelism, as a theory of alternative *transmission* of characters, is still as lacking in a biological basis as in the days of Darwin. The conception of alternative *expression* of characters accommodates the facts better than the Mendelian conception of alternative transmission.

To represent the theories of mutation and Mendelism as emendations of Darwinism necessitated by the discovery of new facts is misleading. In reality these doctrines are fundamentally opposed to the Darwinian conception of evolution by gradual change in the characters of species. Darwinians have often gone too far in claiming that natural selection is the cause of evolution, but the theory of mutation departs as far from the truth in the opposite direction, in ascribing evolution to sudden jumps from one species to another, without any relation to selection.

There is no reason to suppose that sudden individual variations in uniform varieties represent new characters, except as symptoms of degeneration. Uniform varieties are special products of artificial selection or of isolation in nature. A series of mutants arising from the same uniform stock shows a range of individual diversity corresponding to that of the members of a natural, broad-bred species, though the mutants differ from the members of a normal species in frequent evidences of degeneration. Thus the mutations of a narrow-bred variety can be understood as representing the return to expression of characters transmitted from ancestors of much greater and more normal diversity.

O. F. Cook

Washington,
April 24, 1908

BIOTYPES OF CORN

To the Editor of Science: In my recent article, Science, June 5, I stated that Dr. Shull, in his investigations of the elementary species of corn, had been led to think that no biotype of corn had twelve rows, but that he had found those which tended to produce ten and fourteen rows. I further stated that Dr. East had been led, from his investigations, to believe that a type existed having twelve rows. This statement was made after having heard a fragmentary discussion between these gentlemen at the recent meeting of the American Breeders' Association.

Recent correspondence with both of these gentlemen shows that the point of discussion between them was as follows: Dr. East, in discussing Dr. Shull's paper, stated that he thinks there is a physiological reason for the ideal number of rows in corn biotypes to be in multiples of 4; and that therefore more biotypes will be found having 8, 12, 16, etc., rows than those having 10, 14, 18, etc., rows. Dr. Shull replied that in his work he had found no evidence that the multiples of 4 are more favored than the other multiples of 2.

W. J. Spillman
U. S. Department of Agriculture

QUOTATIONS

THE COLLEGE GRINDSTONE

The recently published "Life and Letters of Sir Richard Jebb" must fill the occupants of academic chairs in America with envious despair. This picture of the life of a college professor in Great Britain is far different from that of the college professor in America. It is different, of course, from that of the average university teacher in England; for Jebb was a man of exceptional parts; he was able to do large amounts of various kinds of work—teaching, investigating, lecturing and