

sent these heavier grains back to the South of France, but there they immediately yielded lighter seed.

All those who have closely attended to the subject insist on the close adaptation of numerous varieties of wheat to various soils and climates even within the same country; thus Colonel Le Couteur⁴¹ says, "It is the suitability of each sort to each soil that will enable the farmer to pay his rent by sowing one variety, where he would be unable to do so by attempting to grow another of a seemingly better sort." This may be in part due to each kind becoming habituated to its conditions of life, as Metzger has shown certainly occurs, but it is probably in main part due to innate differences between the several varieties.

Much has been written on the deterioration of wheat; that the quality of the flour, size of grain, time of flowering, and hardness, may be modified by climate and soil, seems nearly certain; but that the whole body of any one sub-variety ever becomes changed into another and distinct sub-variety, there is no reason to believe. What apparently does take place, according to Le Couteur,⁴² is, that some one sub-variety out of the many which may always be detected in the same field is more prolific than the others, and gradually supplants the variety which was first sown.

With respect to the natural crossing of distinct varieties the evidence is conflicting, but preponderates against its frequent occurrence. Many authors maintain that impregnation takes place in the closed flower, but I am sure from my own observation that this is not the case, at least with those varieties to which I have attended. But as I shall have to discuss this subject in another work, it may be here passed over.

In conclusion, all authors admit that numerous varieties of wheat have arisen; but their differences are unimportant, unless, indeed, some of the so-called species are ranked as varieties. Those who believe that from four to seven wild species of *Triticum* originally existed in nearly the same condition as at present, rest their belief chiefly on the great antiquity of the several forms.⁴³ It is an important fact, which we have recently learnt from the admirable researches of Heer,⁴⁴ that the inhabitants of Switzerland, even so early

⁴¹ 'On the Varieties of Wheat,' *Introduct.*, p. vii. See Marshall, 'Rural Econ. of Yorkshire,' vol. ii. p. 9. With respect to similar cases of adaptation in the varieties of oats, see some interesting papers in the 'Gardener's Chron. and Agricult. Gazette,' 1850, pp. 204, 219.

⁴² 'On the Varieties of Wheat,' p. 59. Mr. Shirreff, and a higher autho-

rity cannot be given ('Gard. Chron. and Agricult. Gazette,' 1862, p. 963), says, "I have never seen grain which has either been improved or degenerated by cultivation, so as to convey the change to the succeeding crop."

⁴³ Alph. De Candolle, 'Géograph. Bot.,' p. 930.

⁴⁴ 'Pflanzen der Pfahlbauten,' 1866.