

cases, as briefly stated in the fifteenth chapter, manifest adaptations which favour or inevitably lead to an occasional cross between one hermaphrodite and another of the same species; and these adaptive structures are utterly purposeless, as far as we can see, for any other end.

With *Cattle* there can be no doubt that extremely close interbreeding may be long carried on advantageously with respect to external characters, and with no manifest evil as far as constitution is concerned. The case of Bakewell's Longhorns, which were closely interbred for a long period, has often been quoted; yet Youatt says⁴ the breed "had acquired a delicacy of constitution inconsistent with common management," and "the propagation of the species was not always certain." But the Shorthorns offer the most striking case of close interbreeding; for instance, the famous bull Favourite (who was himself the offspring of a half-brother and sister from Foljambe) was matched with his own daughter, granddaughter, and great-granddaughter; so that the produce of this last union, or the great-great-granddaughter, had 15-16ths, or 93·75 per cent. of the blood of Favourite in her veins. This cow was matched with the bull Wellington, having 62·5 per cent. of Favourite blood in his veins, and produced Clarissa; Clarissa was matched with the bull Lancaster, having 68·75 of the same blood, and she yielded valuable offspring.⁵ Nevertheless Collings, who reared these animals, and was a strong advocate for close breeding, once crossed his stock with a Galloway, and the cows from this cross realised the highest prices. Bates's herd was esteemed the most celebrated in the world. For thirteen years he bred most closely in and in; but during the next seventeen years, though he had the most exalted notion of the value of his own stock, he thrice infused fresh blood into his herd: it is said that he did this, not to improve the form of his animals, but on account of their lessened fertility. Mr. Bates's own view, as given by a celebrated breeder,⁶

⁴ 'Cattle,' p. 199.

⁵ I give this on the authority of Nathusius, 'Ueber Shorthorn Rindvieh,' 1857, s. 71 (see also 'Gardener's Chronicle,' 1860, p. 270). But Mr. J. Storer, a large breeder of cattle, informs me that the parentage of Clarissa is not well authenticated. In the first vol. of the 'Herd Book,' she was entered as having six descents from Favourite, "which was a palpable mistake," and in all subsequent editions she was spoken of as having only four descents. Mr. Storer doubts even about the four, as no names of

the dams are given. Moreover, Clarissa bore "only two bulls and one heifer, and in the next generation her progeny became extinct." Analogous cases of close interbreeding are given in a pamphlet published by Mr. C. Macknight and Dr. H. Madden, 'On the True Principles of Breeding;' Melbourne, Australia, 1865.

⁶ Mr. Willoughby Wood, in 'Gardener's Chronicle,' 1855, p. 411; and 1860, p. 270. See the very clear tables and pedigrees given in Nathusius' 'Rindvieh,' s. 72-77.