

the following account of the wild cattle kept in the Duke's park in Lanarkshire, which is about 200 acres in extent. The number of cattle varies from sixty-five to eighty; and the number annually killed (I presume by all causes) is from eight to ten; so that the annual rate of increase can hardly be more than one in six. Now in South America, where the herds are half-wild, and therefore offer a nearly fair standard of comparison, according to Azara the natural increase of the cattle on an estancia is from one-third to one-fourth of the total number, or one in between three and four; and this, no doubt, applies exclusively to adult animals fit for consumption. Hence the half-wild British cattle which have long interbred within the limits of the same herd are relatively far less fertile. Although in an unenclosed country like Paraguay there must be some crossing between the different herds, yet even there the inhabitants believe that the occasional introduction of animals from distant localities is necessary to prevent "degeneration in size and diminution of fertility."¹⁰ The decrease in size from ancient times in the Chillingham and Hamilton cattle must have been prodigious, for Professor Rüttimeyer has shown that they are almost certainly the descendants of the gigantic *Bos primigenius*. No doubt this decrease in size may be largely attributed to less favourable conditions of life; yet animals roaming over large parks, and fed during severe winters, can hardly be considered as placed under very unfavourable conditions.

With *Sheep* there has often been long-continued interbreeding within the limits of the same flock; but whether the nearest relations have been matched so frequently as in the case of Shorthorn cattle, I do not know. The Messrs. Brown during fifty years have never infused fresh blood into their excellent flock of Leicesters. Since 1810 Mr. Barford has acted on the same principle with the Foscote flock. He asserts that half a century of experience has convinced him that when two nearly related animals are quite sound in constitution, in-and-in breeding does not induce degeneracy; but he adds that he "does not pride himself on breeding from the nearest affinities." In France the Naz flock has been bred for sixty years without the introduction of a single strange ram.¹¹ Nevertheless, most great breeders of sheep have protested against close interbreeding prolonged for too great a length of time.¹² The most celebrated of recent breeders, Jonas Webb, kept five separate families to work on, thus "retaining the requisite distance of relationship between the sexes;"¹³ and what is probably of greater importance, the separate flocks will have been exposed to somewhat different conditions.

¹⁰ Azara, 'Quadrupèdes du Paraguay,' tom. ii. pp. 354, 368.

¹¹ For the case of the Messrs. Brown, see 'Gard. Chronicle,' 1855, p. 26. For the Foscote flock, 'Gard. Chron.,' 1860, p. 416. For the Naz

flock, 'Bull. de la Soc. d'Acclimat.,' 1860, p. 477.

¹² Nathusius, 'Rindvieh,' s. 65; Youatt on Sheep, p. 495.

¹³ 'Gard. Chronicle,' 1861, p. 631