REMARKS

ON

LIVE STOCK.

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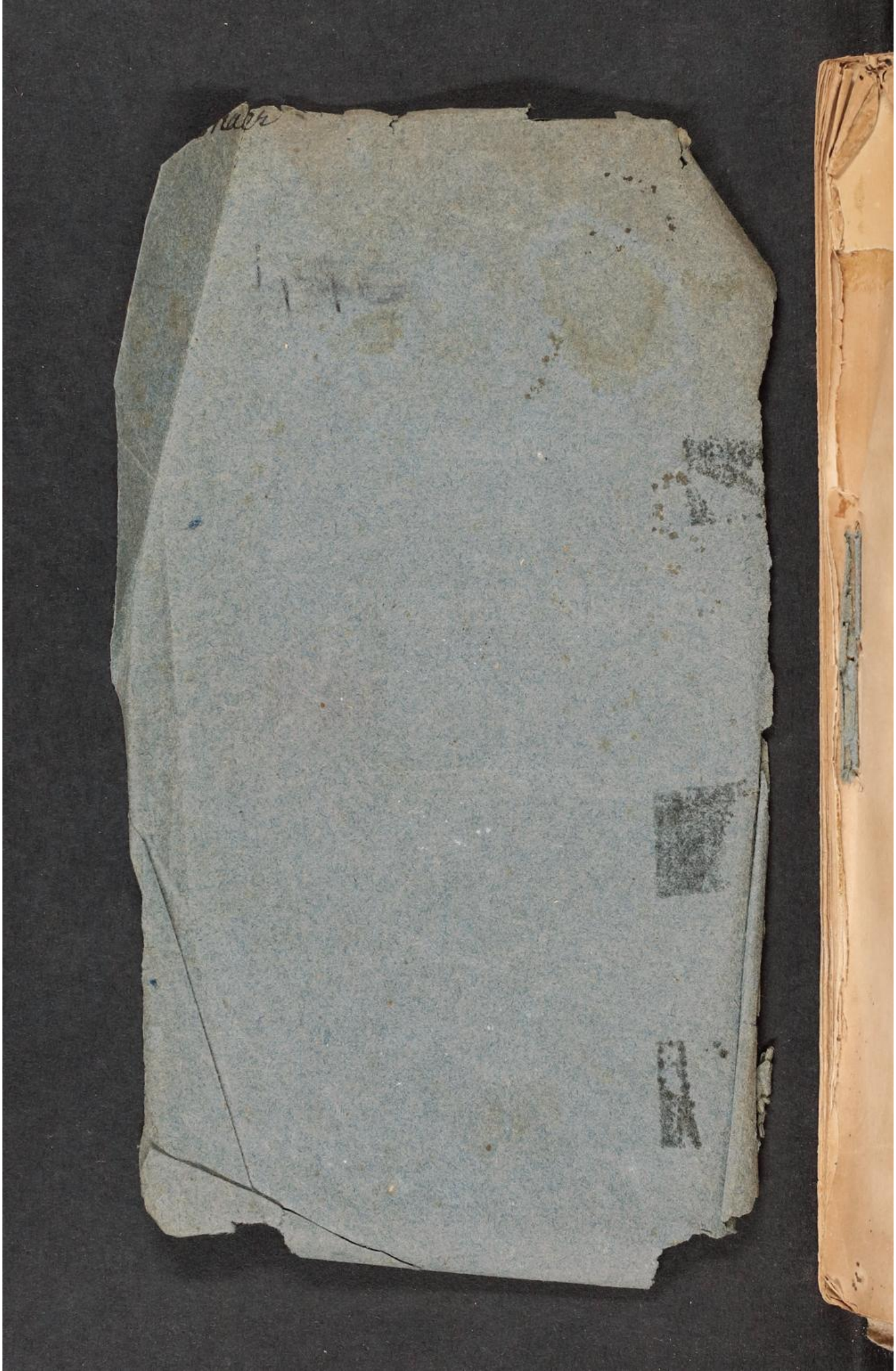

REMARKS

ON

LIVE STOCK

AND

RELATIVE SUBJECTS.

Edinburgh:

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1806.

The remarks in this pamphlet were thrown together from the following circumstance.

Having been favoured with a copy of Mr. CLINE's Observations on Domestic Animals *from the* EARL *of* GALLOWAY, *a nobleman always ready to promote improvements in whatever relates to Live Stock, and reckoning them of great importance, and, with few exceptions, correct, I recommended them to the attention of some friends. I learned, however, that these were not to be procured in this place; and the want of them was the more regretted, because references had been made to them in support of some observations submitted to the Students of Agriculture in the University. It occurred to some gentlemen that it would accord with the author's view, to print excerpts from them, and I was solicited to do so. When complying with this request, I*

added some additional remarks and quotations. The paragraphs with inverted commas, are taken from Mr. CLINE'S Observations.

Arguments in support of some of the subsequent cursory hints concerning Live Stock, and the diversity of Form and Properties in different breeds of the same kind of animals, might have been taken from what is observed to happen in the vegetable kingdom. But some analogous remarks on Plants, and on variety of character in the same species will, perhaps, form another pamphlet.

A. C.

Edinburgh, 5th May, 1806.

REMARKS

ON

DOMESTIC ANIMALS.

DOMESTIC ANIMALS of the same kind have not all the same character and properties. They vary in the general shape of their bodies, and in the conformation of particular parts; in size; in the quality of their flesh; in their degree of hardiness; in their rate of growth; disposition to fatten, &c. It is a matter, therefore, of vast consequence to the husbandman, to be well acquainted with the particulars that serve to distinguish them. An accurate knowledge of these would enable him to select those sorts which are best adapted to his own situation or purpose.

In chusing live stock of any kind, great attention is requisite. Different sorts excel

differently: In none of them are concentrated all the most estimable qualities of its kind. A particular sort may possess properties in a certain view valuable; yet these may be associated with others that render it, on the whole, undeserving of preference. It may have a good form, and be of an eligible size, and yet may be deficient in hardiness—may be unable to endure great cold, or occasional scarcity of food; or, it may mature quickly, with good keep and appropriate treatment, and in such circumstances be preferable to any other, but may still prove inferior in value to some, which, though they may grow more slowly, are yet more inured to the hardships, the coarse fare and inclemency of poor and exposed situations.

Without attending, then, to the combinations of peculiar qualities in the different sorts, as well as to the more general distinctions of form and size which mark them, it may happen, that, for the sake of one or more good properties, husbandmen may introduce among their own stock some greater defects than what they meant to

remedy, or than what previously subsisted. Indeed intelligent breeders are now aware, that the different kinds of our domestic animals have 'points,' *i. e.* forms and proportions of parts, and likewise certain other properties, which are differently estimable; so that what would be an imperfection in one sort, may be none in another, living in a different situation, or serving a different use;—or perhaps it might rather prove an advantage*.

* By the way, on this important subject, it might be here remarked, that in pursuing improvements in this branch of rural economy, or in relation to any particular sort, what the most estimable properties are, can only be determined by patient observation and assiduous research. Though certain breeds have appropriate forms and qualities, which have for some time been so steadily fixed as to be now well known and appreciated; yet, regarding all sorts of live stock whatsoever, much remains still to be investigated. We are hardly *in limine* of the subject. It would require the united exertions of persons living in many different countries, to effect improvements, to confer precision, and to advance our knowledge in this part of the profession. In the mean time, every one for himself must endeavour to acquire all the information competent in his particular si-

Though it is of importance then for husbandmen to investigate all the distinguish-

tuation, or necessary for his particular purpose—he should try by actual measurement to improve his eye, on which at last most persons come to depend, and with sufficient propriety, as it becomes wonderfully correct; he should look through every market which he happens to be in; and he should converse, as far as convenient or becoming, with farmers and dealers of every sort, many of whom carry about with them a great and useful fund of practical lore: He might, if he wishes for more general knowledge, peruse Mr. Culley's book on Live Stock, Mr. Marshall's Rural Economies of different districts of England, and the Reports to the Board of Agriculture, several of which contain peculiarly valuable, because *minute*, information upon this subject; and besides these sources of information, he may attend to the Prints which have been published of the first breeds in England, and likewise to the Models now forming by Mr. Garrard and some others.

It may be farther hinted, that the descriptions given in different publications, are to be received with some distrust; for though they may be sufficiently correct, in as far as they are taken from individuals high in repute, yet the present state of this science (for every branch of useful knowledge may be deemed such, which rests on a distinct set of principles, and which requires for its advancement their

ing properties of the various kinds of stock which they may have occasion for; yet as much advantage has been derived, in many situations, from attempts made to improve merely the *form* of the different kinds, or to acquire the best shaped sorts for the purpose of breeding, rearing or fattening, it may not be improper, separately, to solicit the attention of husbandmen to this subject. It is not therefore intended, in these cursory remarks, to take particular

separate investigation, in order to ascertain their actual and relative influence), does not permit us to conclude, that the selection of such standards of comparison has been at all so ample, or so unbiassed, as to afford strong conclusions in their favour, or to furnish claims for the general and indiscriminate adoption of the forms described, as the chief, not to say the exclusive, models of good shape. It would be carrying these remarks to the length of undue minuteness, to descend to criticism on particular descriptions. It is sufficient to mention, that those which have been given of the best shaped of several of the most noted breeds, are in many particulars discordant. The constituents of excellence are, some of them, hardly ascertained; but were they even fully known and admitted, individual animals rarely, if ever, exhibit, and perhaps equally seldom, can ordinary observers recognise, the whole.

notice of all the distinguishing properties in the different kinds of our domestic animals; but only to submit some hints, chiefly concerning the shape or conformation of their body, in terms applicable to live stock in general.

Mr. Cline* observes, that though the form of domestic animals has been greatly improved, by selecting with care, for the purpose of breeding, those possessed of the best shape; yet the theory of improvement has not been so well understood, that rules could be laid down for directing the practice in every case. He then mentions some particulars respecting the form of animals, and the improvements of which it is susceptible, with the means of affecting these.

I.—On the Form.

'The external form of domestic animals,' Mr. Cline remarks, 'has been much studied, and the proportions are well ascertained. But the external form is an indication only

* 'On the Form of Animals, by Henry Cline, Esq. Surgeon. London: printed by William Bulmer and Co. Cleveland-Row, St. James's, 1805.'

of internal structure. The principles of improving it must therefore be founded on a knowledge of the structure and use of internal parts.

'The *lungs* are of the first importance. It is on their size and soundness that the strength and health of an animal principally depend. The power of converting food into nourishment, is in proportion to their size. An animal with large lungs, is capable of converting a given quantity of food into more nourishment than one with smaller lungs, and, therefore, has a greater aptitude to fatten.

'The external indications of the size of the lungs, are the form and size of the *chest;* the form of which should approach to the figure of a cone, having its apex situated between the shoulders and its base towards the loins.—The capacity of the chest depends on its *form* more than on the extent of its circumference; for, where the girth is equal in two animals, one may have much larger lungs than the other. A circle contains more than an ellipsis of equal circumference; and, in proportion, as the ellip-

sis deviates from the circle, it contains less. A deep chest, therefore, is not capacious, unless it is proportionally broad.

'The *pelvis* is the cavity formed by the junction of the haunch bones, with the bone of the rump. It is essential that this cavity should be large in the female, that she may be enabled to bring forth her young with less difficulty. When this cavity is small, the life of the mother, and her offspring, is endangered.—The size of the pelvis is chiefly indicated by the width of the hips, and the breadth of the twist, which is the space between the thighs.—The breadth of the loins is always in proportion to that of the chest and pelvis‡.'

‡ A form like the one here described, is generally approved of, but not in every case for the same reasons. Mr. Marshall prefers 'the carcase large, the chest deep, and the bosom broad, with the ribs standing out full from the spine; to give strength of frame and constitution, and to admit of the intestines being lodged within the ribs, thereby giving freedom to activity, and beauty to the general form. The back, throughout, wide and level, as a receptacle of beef; the spine being straight from the withers to the tail, to

Our domestic animals are frequently observed to differ in the proportional size of the *stomach* and *intestines*. The finer sorts of horses are known to have a less bulk of intestines, or an intestinal canal of a smaller diameter and capacity, than the coarser—much in the same way as the coarser breeds of both cattle and sheep have larger stomachs, than the finer of the same size and weight†.

please the eye, and perhaps to give a due proportion and arrangement of parts.—The quarters long, lying up high, and standing wide at the nache, to give size to the prime joints, and symmetry to the form.—The thighs thin, and standing narrow at the round bone, to give safety to the dam, and activity to her produce; and perhaps for various other reasons.—The legs (below the knee and hock,) straight, and of a middle length: their bone, in general, light and clean from fleshiness, to lessen the quantity of offal; but with the joints and sinews of a moderate size, for the purposes of strength and activity.' Rur. Economy of the Midland Counties, Vol. I. p. 478.

† This change in the conformation of the animals, though it seems to have been originally produced in the race by supplying them in early life with rich food, and may, in particular instances, prove rather of advantage, yet renders

'The *head* should be small, by which the birth is facilitated. Its smallness affords other advantages, and generally indicates that the animal is of a good breed.

'Horns are useless to domestic animals, and they are often a cause of accidents. It is not difficult to breed animals without them.—The breeders of horned cattle, and horned sheep, sustain a loss more extensive than they may conceive; for, it is not the

it proper to continue more or less the supply; at least not to change too suddenly, in the case of a refined breed, from rich food, which must be, of course, in a small bulk, to a great parcel of inferior forage. In feeding animals, then, one ought to distinguish particularly the breeds, and regulate the treatment accordingly; for though not exactly in the same manner, or though not fed with the same articles, yet in a way pretty similar, the refined breeds of each kind require to be treated on a comparison with the coarser ones. All the finer sorts should have early supplied to them plenty of food; and when advanced in life, plenty of rich food: Where this is not done, they are apt to grow weakly and deformed; and where done, they will be found to be hardy in enduring exercise or exposure to cold, and in keeping free of diseases, to nearly as great a degree as the coarser and apparently more hardy breeds.

horns alone, but also much more bone in the skulls of such animals to support their horns, for which the butcher pays nothing; and, besides this, there is an additional quantity of ligament and muscle in the neck, which is of a small value.—The skull of a ram with its horns, weighed five times more than another skull which was hornless. Both these skulls were taken from sheep of the same age, each being four years old. This great difference in weight depended chiefly on the horns; for the lower jaws were nearly equal, one weighing seven ounces, and the other six ounces and three quarters; which proves that the natural size of the head was nearly the same in both, independently of the horns and the thickness of bone which supports them.—In a horned animal, the skull is extremely thick. In a hornless animal, it is much thinner, especially in that part where the horns usually grow.

'To those who have not reflected on the subject, it may appear of little consequence whether sheep and cattle have horns; but, on a very moderate calculation, it would be

found, that the loss in farming stock, and also in the diminution of animal food, is very considerable, from the production of horns and their appendages*.

* Many intelligent husbandmen, in different districts of the country, do not coincide in opinion with Mr. Cline on the subject of horns.

'The horn,' says Mr. Marshall, 'is the best criterion for distinguishing the different *species* (if the term be applicable) of cattle. It is a permanent specific character. The *colour*, though not altogether accidental, is changeable; and neither the *form* nor the *flesh* are permanently characteristic of any particular species. Good form and good flesh may be found in every species; though they are by no means equally prevalent nor equally excellent in all. But a horn six inches long was never yet produced by the Craven breed; nor one a yard long by the Holderness breed. And the middle-horned breed of Herefordshire, Sussex, and other parts of the island, appears to be as distinct a *species* as either of the former.—These are my only reasons for being so minutely descriptive of the horns of cattle. I am not a bigot to horns of any shape or length. I would as soon judge of a man's heart by the length of his fingers, as of the value of a bullock by the length of his horns. If his flesh be good and well laid on, and his offal be proportionably small; if he thrive well, fat at an early

'The length of the *neck* should be proportioned to the height of the animal, that it may collect its food with ease.

'The *muscles* and tendons, which are their appendages, should be large; by which an animal is enabled to travel with greater facility.

age, or work to a late one if required; I would much rather have him entirely without horns.

'The horn, however, in varieties, may have its use as a criterion. Thus supposing a male and female of superior form and flesh, and with horns resembling each other (as nearly as the horns of males and females of the same variety naturally do), no matter whether short or long, sharp or clubbed, rising or falling; and supposing a variety to be established from this parentage, it is highly probable that the horns of the parents would continue for a while to be characteristic of the true breed, and might, by inferior judges, be depended upon, in some degree, as a criterion. But it is indisputable that horns remain the same, while the flesh and fatting quality change; and every man of superior judgement will depend more upon the form and *handle* of the carcase, than upon the length and turn of the horn: For it is a notorious fact, that the individuals of a given variety may have exactly the same horns, without having exactly either the same fashion or the same flesh. Rur. Econ. of Yorkshire, Vol. II. p. 188.

'The strength of an animal does not depend on the size of the bones, but on that of the muscles. Many animals with large bones are weak, their muscles being small.—-Animals that were imperfectly nourished during growth, have their bones disproportionately large. If such deficiency of nourishment originated from a constitutional defect, which is the most frequent cause, they remain weak during life. Large bones, therefore, generally indicate an imperfection in the organs of nutrition,' especially when conjoined with a form that indicates the lungs to be unduly small, or confined.

On the whole, a compact, round-made, not flat-ribbed body; a deep chest; a broad loin, full flank, and straight back; a small head with clean chaps, and a fine tapering neck; limbs and bones not coarse and large; and a soft but not thick skin, with hair neither staring nor hard, are among the chief marks of a good kind. The shorter legged animals, too, are generally preferable; those of an opposite description being found to be the least hardy, and the most difficult to rear or fatten.

II.—On Improving the Form.

'To obtain the most approved form, two modes of breeding have been practised: One, by the selection of individuals of the same family; called, *breeding in-and-in.* The other, by selecting males and females from different varieties of the same species; which is called, *crossing the breed.*

1.—*Breeding with animals of the same family, or 'in-and-in.'*

'When a particular variety approaches perfection in form, breeding in-and-in may be the better practice; especially for those who are not well acquainted with the principles on which improvement by crossing depends.

'It has been generally supposed that the breed of animals is improved by the largest males. This opinion has done considerable mischief, and probably would have done more, if it had not been counteracted by the desire of selecting animals of the best form and proportions, which are rarely to be met with in those of the largest size.—Ex-

perience has proved that crossing has only succeeded, in an eminent degree, in those instances in which the females were larger than in the usual proportion of females to males; and that it has generally failed when the males were disproportionally large. If a well-formed large ram be put to ewes proportionally smaller, the lambs will not be so well shaped as their parents: but, if a small ram be put to larger ewes, the lambs will be of an improved form.

'The proper method of improving the form of animals, consists in selecting a well formed female, proportionally larger than the male. The improvement depends on this principle, that the power of the female to supply her offspring with nourishment, is in proportion to her size, and to the power of nourishing herself from the excellence of her constitution.

'The size of the fœtus is generally in proportion to that of the male parent; and, therefore, when the female parent is disproportionately small, the quantity of nourishment is deficient, and her offspring has all the disproportions of a starveling. But,

when the female, from her size and good constitution, is more than adequate to the nourishment of a fœtus of a male smaller than herself, the growth must be proportionally greater. The larger female has also a greater quantity of milk, and her offspring is more abundantly supplied with nourishment after birth.

'To produce the most perfect formed animal, abundant nourishment is necessary from the earliest period of its existence until its growth is complete*.

* The kind of food given to animals, should be suited to their ages.—In the habit of very young animals, there abounds, and seems necessary for their welfare, a great proportion of fluid; and therefore more succulent food may be preferable for such: but when more advanced and vigorous, the digestive powers being stronger, and time being requisite for the process of growth, provision less immediately nutritious, or of a coarser quality, may suffice.

To give rich food to young growing stock must be wasteful in general, or with the more ordinary breeds, and indeed can hardly in any instance be of use, excepting in the case of the more improved and delicate sorts, or when it is wished, with its assistance, to render any race finer than it ori-

Regarding some kinds of live stock, cattle for example, a question has been moved—

ginally was. This last effect of pampering is perfectly well understood by the breeders in certain districts of Great Britain, in the treatment of the best sorts of cattle and sheep; and it applies, more or less, to all descriptions of animals.

The effect of pampering, no doubt, is considerably different on horses from what it is on these kinds of live stock; but this circumstance can perhaps be accounted for by the different ways in which these animals are otherwise treated. In the latter, cattle and sheep, the full and rich feeding, with the want of exercise, has a tendency, besides causing them mature early, to make them accumulate fat in all parts of their body, and, in certain breeds, in some parts more than in others. This last circumstance, however, as well as the increase of size in particular parts of their body, is very much the consequence of selecting and coupling together animals that perhaps at first accidentally acquired a particular conformation or size of certain parts, (By *accidentally*, is not meant that the change arose without a cause, but only without any well-marked or assignable cause.) In the case of horses, the exercise which they are early subjected to, tends to preserve them from so great a change as happens to the others. The rich feeding, indeed, gives them an early tendency to plumpness, and perhaps fatness;

how far they could be advantageously reduced to a single breed, *i. e.* whether they

but the exercise and the dressing which they receive, contribute to preserve their form, to check inordinate obesity, and to improve their activity.

Such beneficial effects of well directed exercise on the finer breeds of horses, have been abundantly certified, and are really important facts. These sorts, equally with bullocks, fatten quickly, on having proper food supplied to them, and on being obliged to take rest in the house; for their spirit seldom allows them to enjoy this in the field. Both of them have likewise a tendency to fatten earlier in life, than the coarse breeds, on their getting the requisite and full supply of food suitable for them. Even cattle, and such other animals of the *Bos* tribe, when well fed, trained and subjected to exercise or dressing, much in the same manner that horses are in this country, acquire precisely the like well formed shapes, and equally active habits. This has been ascertained from different accounts to be the case in many foreign countries, where, as among the Targuzinian, Nogayan and Koundour Tartars, bullocks are used for riding; or, as in Cashmere, where they are used both for riding and for drawing coaches; or, as in Hindostan, where they draw the hackrees (a sort of coaches) and 'maintain their rate against horses at full trot;' or, as among the Hottentots, where they are trained to gallop,

should not all possess the same general form and properties, so far, at least, as the latter are connected with the former: And attempts have been made to ascertain, or enumerate, what might prove the chief points of excellence in a sort calculated for general adoption. It has been supposed, that the principal purposes for which cattle are kept, such as for their carcase, their

and even to run down the elk-antelope, *antilope orcas*. All that is said about the unfitness of bullocks for labour, and all the difference between the effect of pampering this species and horses, might chiefly be referred to the kind and proportion of training and exercise which either race enjoy, or are made to undergo in early life. By the way, too, there seems to be very little meaning or weight in the argument taken against the use of the bullocks or other *pecora*, for drawing in the plough or carriages, from the circumstance of their having four stomachs, and their being of the ruminating class of quadrupeds; for some of the fleetest and longest running animals in nature, are of the same description, as the stag, *cervus elaphus;* the roe, *cervus capreolus;* the rein deer, *cervus tarandus;* the chamois, *antilope rupicapra;* the antilope, *capra dorcas;* the hare, *lepus timidus;* and many others.

milk, or their work, are in some degree compatible; and that a breed, now perhaps existing, may yet be discovered, or that one, by cross-coupling, selection, or other means, may be procured, which shall answer not only for these various purposes, but likewise for every diversity of situation; their size, activity and hardiness only varying, so as to suit the circumstances of different grounds, whether upland, hilly and poor, or low-lying and fertile.

This general applicability, however, were it even found to take place, in so far as relates to the *form* of the animal, still would not diminish the necessity of investigating the character of domestic animals in *other* respects. It has been ascertained from some late observations, and the discovery is of importance, that no particular form is exclusively connected with all or any of the most valuable properties otherwise; or that a beautiful and useful shape may be possessed by animals of any size, hardy in every degree, and capable of being reared in different situations, and either with poor or with rich food.

Though perhaps the qualities of activity and strength may be found in animals possessing different forms, and may be conjoined with a shape otherwise valuable, yet *size* is a circumstance which attaches to particular breeds in such a way as not to be rapidly alterable, if due regard be had to the healthy state of the stock. Neither are the properties of general hardiness, and a disposition to early maturity, such mutable traits of character, as would enable the same breed to suit with different situations and circumstances, or thrive equally well in them. Indeed, in these and other respects, a diversity of breed or character would become highly requisite, and even necessary. Besides, the formation of distinct races, by animals occupying different situations, and being subjected to the influence of different powers, or different modes of treatment, though a process slow and gradual, and perhaps often unobserved, is altogether unavoidable; and it is, in some measure, happily so, that the land may be the better or more easily replenished. The discussion, then, about the practicability and propriety

of having only a single breed, in a greatly diversified country, such as Britain, must be restricted merely to what relates to the general *form* of the stock. Probably the very attempt to render the whole alike in other particulars, would not only prove as abortive as it seems unnatural, but might be attended with mischief. It might produce a mediocrity, not of size only, but of character otherwise, which the most indiscriminate and unskilful breeding only could rival. It would likely soon furnish that deplorable display of ignorance and imperfection in husbandry, which the rudest districts exhibit, where science affords no light, and art no useful result.

2.—'*Crossing*,' *or breeding with animals of a different family, or character.*

'It has been already observed, that the power to prepare the greatest quantity of nourishment, from a given quantity of food, depends principally on the magnitude of the lungs, to which the organs of digestion are subservient.

'To obtain animals with large lungs, *crossing* is the most expeditious method; because well formed females may be selected from a variety of a large size, to be put to a well formed male of a variety that is rather smaller.—By such a method of crossing, the lungs and heart become proportionally larger, in consequence of a peculiarity in the circulation of the fœtus, which causes a larger proportion of the blood, under such circumstances, to be distributed to the lungs than to the other parts of the body: and, as the shape and size of the chest, depend upon that of the lungs, hence arises the remarkably large chest, which is produced by crossing with females that are larger than the males.

'The practice according to this principle of improvement, however, ought to be limited; for, it may be carried to such an extent, that the bulk of the body might be so disproportioned to the size of the limbs as to prevent the animal from moving with sufficient facility.—In animals, where activity is required, this practice should not

be extended so far as in those which are intended for the food of man.

'By *character* in animals is meant, those external appearances by which the varieties of the same species are distingushed.—The characters of both parents are observed in their offspring; but that of the male more frequently predominates. This may be illustrated in the breeding of horned animals; among which, there are many varieties of sheep, and some of cattle, that are hornless. If a hornless ram be put to horned ewes, almost all the lambs will be hornless; partaking of the character of the male more than of the female parent.—In some counties, as Norfolk, Wiltshire, and Dorsetshire, most of the sheep have horns. In Norfolk the horns may be got rid of, by crossing with Ryeland rams; which would also improve the form of the chest, and the quality of the wool. In Wiltshire and Dorsetshire, the same improvements might be made by crossing the sheep with South Down rams.—An offspring without horns might be obtained from the Devonshire cattle by crossing with hornless bulls of

the Galloway breed; which would also improve the form of the chest; in which, the Devonshire cattle are often deficient*.'

* That horns, appendages disliked by many good husbandmen, can be readily or generally removed from any particular breed by such a cross, unless long persisted in, may be doubted. It is alleged not to be more than 70 or 80 years since the Galloways were all horned, and very much the same in external appearance and character with the breed of black cattle which prevailed over the west of Scotland at that period, and which still abound in perfection, the larger sized ones, in Argyleshire, and the smaller, in the Isle of Sky. The Galloway cattle, at the time alluded to, were coupled with some hornless bulls, of a sort which do not seem now to be accurately known, but which were then brought from Cumberland—the effects of which crossing were thought to be the general loss of horns in the former, and the enlargement of their size; the continuance of a hornless sort being kept up by selecting only such for breeding, or perhaps by other means, as by the practice of eradicating with the knife the horns in their very young state. Some persons in Argyleshire tried, when large animals were somewhat in vogue, to raise the size of their own stock by means of Galloway bulls; but the descendants of such a cross were very seldom hornless, though they became thereby bigger and heavier in their carcase—a change so far, but in few instances an improvement, and now rarely attempted.

Such a cross, besides these or other advantages accruing from it to the Devon-

Both these breeds are excellent, being well-shaped, small-boned, hardy and readily fattening.

From other facts regarding cattle, which it were needless to mention, it is uncertain whether the Devonshire would come to lose their horns by a cross with the Galloway—which are yet but little removed from a horned breed. Some naturalists ascribe a great deal to the effects of domestication and good treatment, as tending to remove the horns both in cattle and sheep, the bunch, mane, and coarse hairiness of some animals, and other rude insignia of a wild state. It may be so; for the finest forms are in general found in the most favourable situations. Still, however, other alterations in the size or conformation of particular parts may arise, and prove rather a deformity. Some are of opinion, as was the late Reverend Dr. Walker, that when placed in good circumstances, in the case of particular species of sheep, as the number of their horns diminish, the size of their tails increase: And some facts mentioned by the late Dr. Pallas, about the Russian flocks, are rather in support of the same conclusion.—But on all this subject, the advantages or disadvantages of horns, the means of removing them, &c. there is yet much to discover. Even the celebrated Dr. Samuel Johnson, found horns great stumbling blocks in the way of his natural knowledge, when examining the Kyloes, the cousins of the Galloways, in the Isle of Sky.

shire, might perhaps improve the form of the Galloway cattle, which are lighter in

The Doctor remarks, very circumspectly, concerning the breed in that island: 'Of their black cattle, some are without horns, called by the Scots *humble* cows, as we call a bee an *humble* bee, that wants a sting. Whether this difference be specific, or accidental, though we enquired with great diligence, we could not be informed. We are not very sure that the bull is ever without horns, though we have been told that such bulls there are. What is produced by putting a horned and an unhorned male and female together, no man has ever tried, that thought the result worthy of observation.' Jour. to the West. Isl. of Scotl. Perhaps, as some suppose, he might conjecture that the result would be an unicorn. Tho' strangely ignorant about the nature and origin of horns, yet another *sçavans* might be found to keep him in countenance. The celebrated Count de Buffon permitted, it is said, his great work on Natural History to pass through two, if not three editions, before he corrected his mistake about cattle shedding their horns—one into which an intelligent writer on husbandry in this country seems also to have fallen. 'Cattle,' says the latter, 'shed their horns at the end of three years; and towards the root of the second set of horns, there is a kind of ring or joint, formed every year that the animal lives thereafter: So that, reckoning three years for the top, or plain part of the horn, and one for every interval between the rings or joints, the most ignorant

their hind quarters than the Devonshire, though perhaps even these are in that point less perfect than some others.

In the business of breeding, the properties of the parent stock deserve prime attention.

Semper erunt, quarum mutari corpora malis.
Semper enim refice: ac ne pòst amissa requiras;
Anteveni, et sobolem armento sortire quotannis.

Seu quis Olympiacæ miratus præmia palmæ,
Pascit equos, seu quis fortes ad aratra juvencos,
Corpora præcipuè *matrum* legat: Omnia magna.

Nec non et pecori est idem delectus equino.
Tu modò, quos in spem statues submittere gentis,
Præcipuum jam inde à teneris impende laborem.
&c. VIRGIL.

The kind of animals selected for coupling ought never to be of very different

person may, with considerable certainty, ascertain the age of any ox or cow that has horns.' Donaldson's Modern Agriculture, Vol. III. p. 166.—Not only may the age of the animal be known by the horns, but, in some respects, its past treatment or health may be guessed at. The horns are least smooth, or the grooves between the annulets are deepest, in cows ill fed during winter, and in those herds that have not a full or equal supply of food at all seasons.

habits and sizes, nor in any other respect unsuitable matches.—Notwithstanding the confessed advantages derived from cross-breeding, yet great or sudden changes are improper; because such have been found injurious to the health and character of the stock. It has been remarked, that when a slender mare of much blood is covered by a coarse, heavy horse, of the black 'fen breed,' the offspring, or colts, generally turn out a spurious race, possessing little of the strength or size of the one, and perhaps still less of the spirit, activity, fine form, and other estimable properties of the other parent. Bulls of the improved Lancashire or long-horned breed of cattle, when coupled with Galloway cows, have on trial, it is said, produced no improvement on the latter sort of stock. Neither, some time ago, was any advantagé derived from these and some other refined sorts from England, introduced with the best intentions, by different gentlemen, into the county of Fife. The use of rams of the new Leicestershire or Dishly stock, has, with several coarse flocks of sheep, been attend-

ed with no sensible advantage; owing to the very same cause—the character and habits of the breeds being widely different, and the style of management in the district being unsuitable, or inferior to what the descendants of the former would require. The intrinsic worth, however, of such a famous sort, in situations and with treatment befitting them, remains unimpeachable.

Wherever, then, cross-coupling is attempted, care ought always to be taken to do it gradually, and to rear the progeny in a proper manner. When the matching is conducted progressively, and with due attention to the diversity of habit in the animals, and other corresponding circumstances, it succeeds well; and by coupling more or less constantly afterwards with one or other of the sorts, a material alteration will speedily be induced. The chief art would seem to lie in not making animals of breeds or characters widely different, intermix at first: The improvement should commence by coupling the home-stock with one which is already somewhat mixed, but yet which is not far removed

from it in form, properties, and habit; and in process of time, as the blood of the one family is diminished, that of the other will be increased, till improvement or approximation to either side, to the degree wished-for, be attained.—When this business goes on, the progeny must be reared according as the constitution of one or other of the parents, or rather set of parents, is most striking in its composition. Any mongrel breed, if indifferently managed, especially at first, readily becomes diseased and deformed.

Sundry examples might be mentioned of the good effects of crossing the breed.

'The great improvement of the breed of horses in England arose from crossing with those diminutive stallions, Barbs and Arabians; and the introduction of Flanders mares into this country, was the source of improvement in the breed of cart horses.—The form of the swine has also been greatly improved, by crossing with the small Chinese boar.'

Examples also occur of the bad effects of crossing the breed.

'When it became the fashion in London to drive large bay horses, the farmers in Yorkshire put their mares to much larger stallions than usual, and thus did infinite mischief to their breed, by producing a race of small chested, long legged, large boned, worthless animals.—A similar project was adopted in Normandy, to enlarge the breed of horses there, by the use of stallions from Holstein; and, in conseqence, the best breed of horses in France would have been spoiled, had not the farmers discovered their mistake in time, by observing the offspring much inferior in form to that of the native stallions.

'Some graziers in the Isle of Sheppey, conceived that they could improve their sheep by large Lincolnshire rams, the produce of which, however, was much inferior in the shape of the carcase, and the quality of the wool; and their flocks were greatly injured by this attempt to improve them.'

In selecting domestic animals for breeding, it is in the first degree requisite to distinguish not only their form, but likewise

those other properties which render them more or less preferable in different cases. The prime constituents of excellence in each kind of stock, should, as far as possible, be ascertained, and then the respective merits or fitness of the different sorts or varieties of them, for different situations and purposes, will be more easily determined. These varieties, possessed of peculiar characters, are usually distinguished among husbandmen by the term *breeds*, as it is supposed their respective properties are in a great measure communicable to their descendants.

A question of some importance has been started respecting the nature and origin of what are held to be different breeds:—— Are their distinguishing peculiarities original and permanent, or are they accidental and mutable? Or, in other words, are the different breeds of the same species of animals always and invariably distinct; or are they capable of being changed in such a manner as to possess few of their former qualities, and to constitute, as it were, another variety?

Opposite sides of this question have been taken: some writers being of opinion, that the different breeds of each species of domestic animals were originally and are still really distinct sorts, endowed with the power of transmitting to their posterity all their distinguishing properties, with little if any alteration, providing they be kept from coupling or mixing with other breeds; and others ascribing to the influence of local or adventitious circumstances all the striking differences now found to subsist among the same species of animals. This discordance in opinion may, in part, be accounted for. Some observers having discovered that certain properties were less steady when circumstances were changed, have been disposed to conclude, that all are more or less mutable, and more or less rapidly so, according to the influence of the changing powers. Other persons again, collecting their observations in a situation where circumstances were less varied, and where of course alterations on the form and character of animals were less frequent and striking, have been led to draw an opposite conclu-

sion, and to hold, that the appropriate qualities were innate and immutable. Both these sentiments, however, are erroneous; though it must be admitted, that in certain points of view, neither of them wants some shew of argument in its favour.

From a consideration of various circumstances, it is probable, the two following conclusions may be admitted.—In the first place, the nature of their food, climate, and other circumstances, seem capable of altering, in a more or less slow and gradual manner, the character and form of all animals, and in the end, remarkably, the properties of any particular race or family that has been subjected to the continual operation of such changing powers. The alteration indeed from the previous state may be apparently little in an individual; but the change in the parents being more or less communicated or superadded to a similar one in the progeny, the difference so produced from the original state of the same race must, in time, become pretty striking and important. But, in the next place, facts and numerous observations tend also

to establish this conclusion, that the different breeds or varieties of our domestic animals are, in general, so fixed and incapable of speedy alteration, that they may be deemed comparatively permanent; and that, when subjected to the influence of circumstances which have not much power, the individuals cannot be greatly affected by it, and no material change may ensue even for many generations. In situations nearly similar, though distant, if any change take place, it will be so insignificant, that breeders may reap the advantages arising from the possession of the best improved sorts, without the labour and expence of original refinement, which, to any considerable length, it might, in many cases, be difficult, if not impossible to accomplish. —These conclusions seem to conduct to the safest practice. They will instruct the husbandman, that the most pure and perfect races may be debased by improper mixture, and injured by improper treatment—that indiscriminate matches in breeding, and inattentive management in rearing, are alike capable of producing a worthless progeny.

'Attemps,' as well observed by Mr. Cline, 'to improve the native animals of a country, by any plan of crossing, should be made with the greatest caution; for, by a mistaken practice, extensively pursued, irreparable mischief may be done.

'In any country where a particular race of animals has continued for centuries, it may be presumed that their constitution is adapted to the food and climate.—The pliancy of the animal economy is such, as that an animal will gradually accommodate itself to great vicissitudes in climate, and alterations in food; and, by degrees, undergo great changes in constitution; but these changes can be effected only by degrees, and may often require a great number of successive generations for their accomplishment.

'It may be proper to *improve the form* of a native race, but at the same time it may be very injudicious to attempt to *enlarge their size.*—The size is commonly adapted to the soil which they inhabit. Where produce is nutritive and abundant, the animals are large, having grown pro-

portionally to the quantity of food which, for generations, they have been accustomed to obtain. Where the produce is scanty, the animals are small, being proportioned to the quantity of food which they were able to procure. Of these contrasts, the sheep of Lincolnshire, and of Wales, are examples. The sheep of Lincolnshire would starve on the mountains of Wales.'

The size of animals, as already hinted, appears in many cases, to bear some relation to the kind or quality of their food. A pasture which is luxuriant, though some what coarse, in low or mild situations, is generally found, in process of time, to raise live stock to a large size; while a fine, short, dry one, in higher lands, supports best, and contributes in some measure to form, the smaller sorts. Objections have been stated to this opinion about the effect of pasture; but it is undeniable, and is admitted by all or most correct observers. This fact indeed cannot be denied, that grounds, the herbage of which is short and scanty, carry in some countries larger breeds than are found even on rough and long pas-

tures in others; but still, every where, those yielding the most abundant produce, raise, on a comparison, the largest stock. In poor grounds, or in cold situations, from the scantiness of provision, a small sized animal suits generally best; for such can thrive or be well supported, where a large one could not subsist—-an observation which every one must have made. It is however certain, that if in the same ground, the herbage be permitted to become longer, before it be much cropped or eaten down, a larger sort might be kept than otherwise; and this might frequently be even for the advantage of the pasture. Accordingly, where cattle graze at large in rough grounds, or upon cultivated herbage, raised on land of an ordinary, and especially of an inferior description, or indeed in any situation where the produce does not do to be closely fed, and where, for the purpose of cheeking 'fog' or moss, and of promoting its own growth, it must be left somewhat long, there a stout and somewhat large sort, less nice and more promiscuous in their feeding, will answer fully better than

a smaller one equally hardy and of a similar character otherwise: For in proportion to their size, all animals are disposed to reject the stems and coarser parts of plants, and to select the leaves, the softer, smaller and more delicate herbage*. If a breed be

* It is chiefly in such situations, pastures of a middling description, growing herbage more abundant in quantity than valuable in quality, and preferably adapted to rearing and not fatting stock, that the large kinds are found best to answer; and in some cases, as on sound, dry-bottomed soils, able to bear their tread in all seasons, to return rather more than the smaller. Were lands of that description to be filled with a greater number of a less-sized breed, admitting it to be of an equally good shape, and as hardy and thriving, a good deal of attention would be requisite in stocking them. Should the ground be understocked with such, the herbage would be liable to be eaten less evenly than with the former: And should it be fully stocked, so as to avoid this kind of detriment, and to be more closely depastured, then the herbage itself is apt to suffer and to rise up more slowly than otherwise—a portion of the foliage, not over-closely cropped, left on any plant, promoting much the vigour and growth of what is only beginning to spring from the same roots. Other very serious disadvantages likewise attend the close feeding of inferior pastures. Wherever the grasses

rather coarse, and the grass fine and luxuriant, the number of animals may without

and the more valuable species of plants are in a low, enfeebled state, the more hardy and worthless vegetables are apt to prevail. Even 'fog,' the *hypna* and moss plants rising in such grounds, come, frequently in a very few years, to do much mischief; for though comparatively puny pests, yet as they vegetate in the cold and moist seasons of the year, the spring and autumn, when the better species are but beginning to grow or are declining, they greatly check the latter, and in many instances ultimately extirpate them.

If such are apt to be the bad consequences of depasturing inferior but luxuriant grass-lands with small animals of a coarse breed, the evils would be still more strikingly felt with a small and fine sort. Were such grounds to be grazed by a parcel of the latter, when of a full age and intended for fattening, and were they with this view to be lightly stocked, so as to allow the animals a fuller supply or a better choice of food, the general produce on the land would be less equally eaten than with the smaller sorts of the coarser breeds; and the same extent of surface might yield greatly less, than were the use of the pasture more appropriate, or an inferior stock, and that also somewhat large, to be preferred. Were a refined or early fattening sort, of whatever size, to be put on the ground in such numbers as to be forced, for their sustenance, to consume fully the

detriment be proportionally increased, so as to suit the abundance and quality of the pasture.

Though a large size in any breed may not suit particular situations, a barren soil, or a bleak climate, or may, in other respects, be disadvantageous, and though smallness of size and hardiness of constitution frequently occur in the same breed, yet the two last properties have no natural or necessary connection. The Norfolk

produce and leave the surface nearly bare, they might be found not to thrive, and do rarely, in such circumstances, answer the purpose of the grazier. At any rate, they would be found to return less than a coarser sort, and perhaps even less than a larger animal of that inferior sort.

These cursory hints are subjoined respecting size, taken in connection with the form and properties of animals, and with a reference to different pasture grounds, because the farther improvement of the character, and even the preservation of the fine form of any breed, howsoever acquired, whether by selection among the same race, or by cross coupling, or both, depend very much on its being well treated—as indeed likewise do the gains resulting to individuals and the community at large, from the keep and spread of superior live stock.

breed of short-wooled sheep, and some of the Yorkshire breeds of coarse-wooled ones, are both rather larger and much more hardy, or can better endure hard fare and fatigue than some others, as the improved Leicestershire breed; and in relation to food, the former will fatten on a pasture which would barely support the latter sort. The Kyloes in the Isle of Sky, or West Highland breed of cattle, are no doubt a small and most hardy sort; but the Alderney cattle are the smallest, and, of all others, the most delicate breed of this kind of animals found in Great Britain.

'Crossing the breed of animals, may be attended with bad effects in various ways; and that even, when adopted in the beginning, on a good principle: For instance, suppose some larger ewes than those of the native breed, were taken to the mountains of Wales, and put to the rams of that country; if these foreign ewes were fed in proportion to their size, their lambs would be of an improved form, and larger in size than the native animals; but the males, produced by this cross, though of a good form,

would be disproportionate in size to the native ewes; and, therefore, if permitted to mix with them, would be productive of a starveling, ill formed progeny. Thus a cross which, at first, was an improvement, would, by giving occasion to a contrary cross, ultimately prejudice the breed.

'The general mistake in crossing has arisen from an attempt to increase the size of a native race of animals; being a fruitless effort to counteract the laws of nature.—The Arabian horses are, in general, the most perfect in the world; which probably has arisen from great care in selection, and also from being unmixed with any variety of the same species; the males therefore have never been disproportioned in size to the females.—The native horses of India are small, but well proportioned, and good of their kind. With the intention of increasing their size, the India Company have adopted a plan of sending large stallions to India. If these stallions should be extensively used, a disproportioned race must be the result, and a valuable breed of horses may be irretrievably spoiled.'

From the foregoing observations, it is reasonable to draw this conclusion: that it is wrong to enlarge unduly a native breed of animals. The enlargement ought only to be attempted when, from a better stile of agriculture, the food raised for their support is both increased in its quantity and improved in its quality; for, otherwise, in proportion to their increase of size, they are apt to become less hardy, more liable to disease, and worse in form.

The age and condition of the animals employed to procreate, are likewise circumstances of some consequence. No animal whatever, at least none of our domestic animals, the progeny of which we wish to be perfect, should be allowed to propagate too early in life. This circumstance has been understood and attended to in most ages and countries where men had opportunity or were disposed for correct observation. The females, when rather young, or when unfavourably placed and deficiently fed, should not be allowed to have too close a succession of pregnancy and bearing.—The time of life to which

they may be allowed to breed, may depend on circumstances, as the character of their race and the way in which they are kept —coarse or scanty food, severe work or exercise, and bad treatment of any kind, breaking down more early their health and vigour.

In the case of most sorts of live stock, and in all ordinary situations, it may prove of consequence to attend to the proper period of coupling. The young animals should be brought forth neither so early in the season as to find in their mothers a scantiness of milk, from the want of grass or succulent food, nor yet so late as to be themselves, (by reason of their being over-young,) weakly and unable, or less able, to stand the cold and hardships of winter.

In general, too, when the young stock are weaned, particularly horses and cattle, they ought to be placed in some good pasture ground, where they may continue as long as the weather will permit them to do so, not with safety merely, but with advantage: It is highly improper, what many negligently do, to let them remain

in any poor or exposed situation, till they begin to pine and receive a check in their growth, from which they difficultly recover. As winter approaches, they should be gradually accustomed to any change in their provision; and through that season, while kept in the house, sheds, or farm yard, they might advantageously receive some succulent food, as turnips, potatoes, cabbages, rape, carrots, &c. along with their dry forage. For this application, most prudent husbandmen now-a-days provide some such articles, if their situation at all permit their doing so.

Even a very small quantity of moist, nutritious fare, regularly supplied to live stock then, is attended with striking advantage. The young are thereby preserved in good plight, so as to derive immediate benefit from the summer pasture. Indeed their growth is carried forward with the aid of such feed, at nearly the same rate during winter as the other seasons. Where green vegetable provision is not to be obtained, or when it fails in advanced spring, boiled corn, either by itself or mixed with chaff,

cut hay or straw, is frequently had recourse to, especially in the feeding of the finer breeds. Other articles may be used, such as bran, grains from the distillery or brewery, oil cake from lintseed, or that seed itself whole or ground, and mixed with or diffused in water, &c. Probably no cheaper or better substitute could be found than hay, made of *under ripe* herbage, as rye-grass, &c. given by itself, or in some mixture, or in a dry state, but then with a full allowance of drink to the animals, or after it has been rendered moist by being steeped in water, whether hot or cold*.

* As to the best period for cutting or using cultivated herbage, in this country generally composed of rye grass or 'ray grass,' *lolium perenne*, and red clover, *trifolium pratense*, with small proportions of other species, as white clover, *trifolium repens*, 'yellow clover' *medicago lupilina*, rib grass, *plantago lanceolata*, &c. it may be here suggested, that the mixed crop should be cut much more early than it commonly is, especially if it abounds with a great proportion of the first mentioned species. It matters nothing, though many stablers and grooms prefer rye grass so far advanced as to have its seed mostly ripe; for as the horses under their charge usually receive at the same time a good allow-

In rearing live stock of all descriptions, with whatever view, it is a matter of great

of corn, the hay does often perhaps little more than divide the other food, bear bulk and comfortably fill the stomach. Such hard fodder is reckoned a more lasting bait: and certainly it is, if one shall judge by the time required to eat it, and perhaps to digest it, and not by the time it supports the animal, or the degree of nutriment it contains. Grooms having the refuse seed as a perquisite, are sometimes led to prefer the ripened produce from motives which overmatch their virtue: a ton of ripe rye grass hay has frequently yielded a quantity of seed worth 30 *per cent.* of its own price. For the husbandman, however, it is of great consequence to be aware, that the under ripe grass is, for his purpose, by far the most valuable, a fact not so generally understood or minded as it ought to be. Old stale rye grass made into hay, is not greatly superior to the straw of corn; while the young herbage, so prepared, is very fattening—a thing quite analogous to what takes place with several other sorts of vegetable produce.

It need hardly be mentioned here, as it must be known to most persons, that in the younger succulent state of the stems and footstalks of the leaves of many plants, what afterwards hardens into a stringy, dry, hard or insoluble substance, is originally a soft, nutritious mucilage. We can ourselves use as food many plants, or parts of plants, in a cer-

consequence to do this in a such a manner as shall turn the vegetable produce to the

tain state or period of their growth, which we could not afterwards digest, even with the assistance of heat employed to prepare or soften them somewhat. The young stalks of coleworts, cauliflower, turnip-rooted cabbage, german beet, asparagus, and many other species which could be named, afford examples of this change which takes place in the consistence of plants in the progress of their growth. Another instance, shewing the advantage of cutting herbage of different sorts in its early state, occurs in the case of pigs fed on clover, rye, and buck wheat, *polygonum fagopyrum*, They thrive on these articles, particularly clover, if cut sufficiently early, *i. e.* when considerably moist and succulent. But *after* the flowering period, and even long *before* the seed is ripe, much of the produce is rejected by them; or, if they are obliged to use it, they pine over it, or make small progress; and such an application of the vegetable produce, becomes then not economical. In some countries abroad, cows are fed at times on white mustard, *sinapis alba*, cut green, which in the hard state it afterwards acquires, would be totally rejected by them. The same happens with buck wheat. Rye, which, as some allege, affords the best thatch and the least nutritious provender of any corn crop, is, in its early and more juicy state, a green forage that will support well or fatten any kind of live stock,

best account, and yet duly feed the animals to the sustenance of which it is applied.

especially cattle and sheep. This is the case indeed with all gramineous and other plants, in a duly young, not in a very young state. It has been ascertained that the hay of particular fields, farms, and even districts of country, is richer than others. This superiority, in many instances, may be partly owing to the higher fertility of some soils than others; good lands always yielding the most nutritious produce, though the species and age of the plants be the same. In other cases, however, the difference in the value of the hay, from rye grass, &c. would appear to be owing, principally, to the plants in one situation being less ripe and hard, when mown, than in others. Cultivators in different quarters are not uniform in their mode of practice as to this matter; and the conduct of some, in respect to the early cutting and careful and speedy drying and securing of their hay, is commendable.

When the herbage is mown at a proper period and intended for hay, it ought to be cured with all dispatch; and of course, by turning over and exposing the article to the influence of the sun and air till dried so much as to be in no danger of afterwards spoiling. Coiling together the half dry herbage, under the notion of saving the 'natural or native juices,' is so stupid a procedure as not to be referred even to natural or native nonsense. What but mere aqueous moisture exhales,

Hence it is of importance to attend, both to the kind of article given as food, and to

and what is the purpose of retaining any portion of it? It can prove of no manner of service; and if the parcel be damp, there is apt, particularly in the case of fine and soft green forage, to occur mouldiness, or perhaps chemical decomposition, a bad taste and smell, and even rottenness. In thus opposing a notion as to hay making, which could have had no better origin than the dream of a sciolist, it is not by any means supposed that the hay shall be left so long and improperly exposed as to be in danger of being hurt by rain, or of being bleached, and wasted. It is merely meant to suggest, that, while curing with the utmost degree of exposure in fair and warm weather, there is not the least risk of injury from over drying.

When herbage is cut at a proper time, and made into hay, the produce loses, by the drying, little, if any thing at all, of its nutritious quality; for, when moistened, it returns again to a condition quite similar to that of green forage at first. This appears altogether probable, because, in both states, it affords the same kind of juice by expression, and the same proportion of soluble mucilage or other matter extracted from it by maceration or boiling—as has been ascertained on trial. Now over-ripe, and damp, ill-cured hay, are both bad; the former, because it does not in fact afford such a proportion of soluble and nutrimental matter as

what more immediately relates to the animal itself—its peculiar nature and the circumstances in which it is placed.

the greener herbage; and the latter, because of the strong tendency which it has either to become mouldy, by being over-run with *fungi*, (for mouldiness, like the blue matter occupying the cells of some cheeses, is nothing but a forest of mushrooms) or to 'ferment,' chemically decompose, acquire a sour and bad taste, and turn comparatively useless. It is not denied, that several acrid plants, *ranunculi*, and others found in the herbage of wet meadows, become more mild and less dangerous by being mown and made into or mixed with hay; but this change is owing to nothing but simply drying, which renders mild some plants that are in their recent state deleterious, but which has no effect on what are called the narcotic vegetable poisons. Neither is it denied, that, in the case of some coarse, meadow herbage, abounding with matter partially fibrous and indigestible, hay may be improved by being less exposed, or rather, kept so covered up, either in the swath or cock, as to be liable to some alteration or softening, from the warmth and effect of incipient decomposition apt in such circumstances to take place. But this sweating, as it is called, is a very ticklish business, and attempts to obtain the supposed advantages attending it have occasioned the loss of much provender

In supplying animals with food of a richer or finer sort, of a greater or less

otherwise valuable: and it has never yet been shewn or rendered in the least degree probable, that the same sort of herbage, cut earlier and dried *quam primum*, would not have been much more valuable, than when mown late and fermented with all the care and address that could be exerted, not by ordinary haymakers, but by professed chemists.

It would seem proper, as far as yet ascertained, that herbage should be collected for young animals with an earliness proportioned to their time of life, giving to the youngest the most succulent provender, or what would become so on being moistened. When young animals are so fed in advanced spring, after the green crops are consumed and before the grass has risen, a trying period in most situations, they should always receive, along with the dried young herbage, (the best of substitutes,) a full supply of water for drink—a thing they rarely enjoy any where in Great Britain. They should either obtain a frequent supply of it in pails, or, what would be better, have it in a trough before them, that they might drink at pleasure. With such attention, and kept moderately warm, clean and dry, (all which can be done with little additional expence, and none that would not be well repaid) every sort of live stock would, on the return of summer, exhibit a more thriving appearance

bulk, in a drier or moister state, whether from the nature of the provision itself, or

than otherwise, and prove greatly more valuable to their owners and the community.

Some persons count a good deal upon getting the seed of rye grass in a ripe state, in order to be eaten along with the hay; but the latter thereby loses in its quality more than can be made up by the acquisition of the former. It is even a doubtful matter, were oats, rye, or any other of the large species of *gramina*, those bearing seed of the largest size, to be raised for provender, whether the same extent of land would not yield more useful produce, taken quantity and quality together, if such a crop were cut long before the anthers or flowers appear, than after it has fully matured —supposing both seed and straw to be consumed by live stock: at least there are no facts to prove, that the ripened produce would, for such an application, be the more valuable, or that one full crop would, on the whole, be superior to two or more small ones, obtained at different times through the same season or period.

Besides these considerations, several advantages attend an early cutting. It contributes to preserve the plants in vigour not only for the after part of the same season, but for succeeding seasons and crops, and it retains them in the ground longer than they would otherwise continue. Most gramineous plants, which have been long under culture, seem little capable of recovering themselves, when they are

from the drink used along with it, many particulars require consideration. The

cut down only after their stalks are full grown. In every species of corn, and in the annual grasses, (of which description rye grass, probably, has a tendency to become after some years cultivation in certain grounds) when the seed is filling, the entire plant becomes somewhat hard and dry; then fewer and feebler buds spring, to form new roots and stems, and at length the dwindling produce ceases to survive.

It is probable however, that the decay in the herbage does not proceed so much from the mere arid state of the roots connected with advanced stems, being unfavourable to the evolution of recent buds, as from the circumstance of the buds themselves, in the case of a close and tall growing crop, being not only bereft of a portion of the nourishment they would require duly to preserve them, and would indeed receive, were it not withdrawn by the vigorous vegetation of the first stems, but kept so long excluded from the influences of the atmosphere, that they become unhealthy, weak and short lived. In the course of time, an impression is made on the produce of plants so circumstanced, and a character and habit, altogether different from those of the original species, are induced, by this mode of culture, or rather by this attainment of full growth; for it happens with plants, whether cultivated or not, that have repeatedly risen for a length of time into maturity. Such die away: Witness the different species of vegetables that have grown

character of the breed has been already mentioned as a circumstance deserving

in successive generations in the same situation, composing now a part of the stratified collection in many peaty bogs, and especially in those now occupying the surface of what must have been at one time dry land, as where a moss surmounts the ruins of a forest, or perhaps a timber-grove. The race of no species of gramineous plants survives long in the same place, unless they are more or less eaten down by animals, so as to have the extent of their growth regulated. When left long untouched, every description of them has a tendency to become *over*, or *under* luxuriant; and either condition issues in their decline and final departure, leaving the surface to be possessed by other species in their turn. The existence of particular animals would, therefore, seem to be necessary for the growth, perfection, and continuance of particular species of vegetables: When the latter cease to be useful, from the absence of the former, they must give place to others, which, in the wise and beneficent economy of nature, may be turned to more advantage by sustaining another class of animals, each appropriated to the other for their mutual benefit.

'And bear them hence, the plant, the flower;
'No symbols those of systems vain!
'They have the duties of their hour,
'Some bird, some insect to sustain!'

Farther, it is with plants as with animals, by culture and domestication, their general form and the proportion of their

prime attention. But besides, and along with it, the age of live stock must be at-

several parts may be altered, perhaps in certain respects improved, and their size enlarged; but their vigour may not be increased nor their life prolonged. It is highly probable, that, in consequence of this unavoidable change in the habit of vegetables from cultivation, the same variety of any species will not suit different purposes; and that rye grass, the seed of which has been raised from a series of cultivated plants, and hence perhaps now of an annual habit, may not continue in the ground or serve the purpose of perennial pasture; and, conversely, that the seed from the same species in a natural, uncultivated state, may not yield such a weighty produce of hay as the other, at first, or till culture has enlarged its size.

By a change of circumstances, prodigious alterations may be effected in the mode of growth, size, and habit of plants in many respects. Were some plants of our annual *gramina*, and even our different species of corn, to be placed in favourable, mild and moist situations, not too much crowded together, and, by repeated and timous cropping, to have their early stems prevented from rising too much, so as to withdraw the sap, and exclude the sun's rays and air, from the after springing ones, a series of vigorous buds might evolve through successive years, and the appearance (for it is nothing more) of the species being perennial, would again

tended to, when we wish to draw from our vegetable produce, so applied, its full value.

occur. This striking change has been induced on different species of corn, by all accounts, when the seed of such has been accidentally dropped, and the plants have been allowed to grow, in a situation calculated to preserve them. It is said by De Non, and other travellers of some credibility, that plants of our common wheat, *triticum hibernum*, have been observed growing wild, *i. e.* springing, during a series of years, by successive side-shoots from the root, (as most of our perennial *gramina* do,) in some parts of Sicily and other countries. Rye has shewn the same tendency in certain warm, moist, fertile spots in the West India Islands. The oat, *avena sativa*, was likewise observed in a kind of wild condition, with a vivacious habit, by Commodore afterwards Lord Anson, in the Island of Juan de Fernandez. Barley too is said to have been found in a similar state in Egypt, and some of the Greek or Eastern Mediterranean Islands. A single grain of wheat by taking off and planting the successive shoots arising from the transplanted ones, as they attained a size permitting that treatment, in the course of 18 months in a green-house, was so multiplied as to produce of ripened seed, between three and four pecks.

These observations tend to prove, that many circumstances, soil, situation, culture or artificial management, contribute to vary the character of gramineous plants. From

The tendency in animals to become fat, usually takes place at a certain advanced,

these likewise may be gathered the reasons for cutting the plants composing the herbage crop, in their early state. In many ways indeed considerable benefit results from doing so. Not only is the produce of a superior description, but the after growth comes forward more rapidly, and a greater return for the season is obtained, from the same extent of ground, than were the crop to be allowed to stand longer, when its vegetation proceeds proportionally slow, and other bad consequences ensue. With early cutting, weeds, rising among the cultivated plants, have little time to mature and shed their seeds; and the texture of the ground, by the shade of the foliage, and by the enlargement, multiplication and movement of the roots, is preserved in good condition.

Since some of these remarks occurred, on the proper period of cutting the grass crop, several years ago, as the subject seemed of importance in husbandry, I have been anxious to ascertain correctly, or from the best information, the difference in value, as food for live stock, between young and old herbage. The result of numerous trials accords with what has been already stated. The superiority of the former has been chiefly discovered in those cases, where nothing but the herbage itself was supplied to live stock; for when corn or any other kind of food was at the same time given to them, the value of any one of the different articles, separately, could not be well estimated. In

more readily than at an early period of life. Though this disposition may be made to arise

several cases, where calves were fed on steeped hay, or 'hay tea,' it was invariably found that they throve best on that of young herbage. This hay, whether softened by cold or infused in hot water, (which last is now a very common and a very proper mode of preparing it,) or whether given to them dry, discovers nearly in an equal degree its superior quality in supporting the young stock.—By the bye, with respect to calves, the most successful plan of rearing them with this article, by all accounts, would seem to be the following: The hay ought to be chopped into short lengths, of from 6 to 10 inches; infused in boiling water, in vessels not large, and used when sufficiently cool, not allowing it to be kept for too long a period. When it has coolled slowly in large vessels, or is not soon used, if the herbage be very young, the infusion is apt to become sour; a condition which some have thought hurt the calves, and gave them a scouring. The infusion, liquor and hay together, may be given them, at first mixed with some milk, or milk and a little meal or flour, in small quantities, but at short intervals. They soon learn to eat the hay itself; and if they cannot, with advantage, be left to depend wholly on this kind of provision so early as some have asserted, yet, in in a few weeks, they discover much liking for it, improve fast, and require nothing else before they go to pasture. Some have proposed, and indeed have succeeded tolerably well in

sooner in any animal by rich feeding and good treatment than otherwise, yet it takes their attempts to fatten them with this article, supplying them towards the end of the business with some meal or coarsely ground corn.

Dr. Anderson, in his ' Essays on Agriculture and Rural Affairs,' mentions a circumstance about grasses that may deserve notice. In most of them, should the stalks be destroyed after they are fully formed, others do not rise that season; the plants running afterwards to leaves, and some species likewise spreading by the roots. This alteration in the mode of growth, however, is perhaps hardly to be ascribed to the effect of cutting off the stems, but, probably, rather to the period of the season, when that is done, being too far advanced for their renewal. When performed timously with those species which send up their stems early, they usually shoot up again, especially if superior fertility in the soil encourage their vegetation. After the seed stalks of even vivacious plants are destroyed, there is an interval before others appear. Foliage seems to be necessary for the production of seed-bearing stems; for the latter rise only after the former has survived for some time. Plants live not only by the functions of their roots, perhaps chiefly absorption, but likewise by those of their other parts in the atmosphere. Though the common leaves contribute to the due evolution of the young buds that become stems, yet, in certain plants, it is not requisite that they precede them in

place, generally, when the animal has acquired its full growth or proper size, that

the same season. In colts foot, *tussilago farfara*, and some other species, the leaves of one season are found to surround, prepare, it is thought, or protect the stem-buds of the next. The case may be somewhat different in the grasses, yet still this circumstance is worth regard; for the stems rising on the uneaten spots are more forward in springing than those on other parts of the same field, which have been closely cropped through the fall of the year. Vegetation proceeds most favourably, vigorously and rapidly, when the different parts of any plant bear a just proportion to one another; and the growth of the roots is sensibly affected by the deficiency of foliage, and *vice versa*. Close feeding then, and, perhaps, close mowing also, by destroying too many of the common leaves, may, as formerly hinted, enfeeble the herbage and render the produce comparatively scanty, and likewise less nourishing: Hence over stocking may occasion the rot in sheep.

In seems owing to the circumstance now mentioned, that in pasture fields those spots of coarse grass, (coarse or long from age, for the species may be the same) though in spring swept down by the sithe and left as bare as any other in them, are invariably the first which send up stems in summer; and these being disrelished by pasturing stock, are left to cumber again the surface. Thus, the same spots assume their former appearance on the return of another fall, and what they

size to which its own state of health, its mode of living, and the habits of its kind would raise it. It would appear, that this disposition to fatten, shews itself, in the improved breeds, even *before* they have attained their full size; whereas, in the coarser kinds, it does not occur till they are somewhat more advanced in life, *i. e.*

produce may incur the same neglect during a succession of years, unless their condition be retrieved. This is a thing about which any person may satisfy himself, by marking particularly such rough patches in autumn, and observing what happens against another season.—By the bye, those coarse tufts in pastures, though perhaps *dans la nature*, and something picturesque, (if one can use such 'piebald language,') are not merely deformities, spoiling the fair expanse of lawns or grass lands, but really detrimental. Live stock turned during summer into fields, where from some neglect or other, such are frequent, will pine over the short and more tender produce, rather than touch them. They can be overcome by repeatedly sweeping them down in moist weather, when the growth stands best to the sithe; and some young, voracious cattle might be employed to lick up what is mown. In dewy mornings, as observed by Mr. Marshall, cattle, on rising from their lairs, eat, of their own accord, such stale herbage when cut down, before the growing grass, which they prefer at other times.

till the period of their full growth has arrived, and perhaps, in sundry cases, not even till this has been some time over: Still in both sorts, and in all animals, a very considerable change in this respect takes place with their age. At an advanced period, if the food which the animal receives, shall prove, in point either of quantity or of quality, nothing more than barely sufficient to support it, there will not arise any tendency to fatness, and indeed this cannot be expected in such a case; but if food be supplied in plenty, and be at the same time considerably nutritious, especially if it be much more so than what the animal had been accustomed to, then such a condition will take place.

If food very nutritious be supplied to any animal in a growing state, it may probably, for a time, cause its growth to proceed quickly; but if the feeding be urged so far as to induce a state of fatness, the growth or enlargement of the animal will not proceed at the same rate: And the opinion seems to be just, that, in such a case, though it may grow more quickly, for

a time, yet it will not, ultimately, acquire a size equal to what it would do, were it more coarsely, and less expeditiously fed. That large breed of cattle, which, it is said, came originally from luxuriant meadows on the continent, or rather in the north of Europe, known in this country by the names of the Holstein, Dutch, Holderness, Lincolnshire, Teeswater, or short horned breed, though they acquire, in the course of time, when fed on very rich pastures, a quick growth and rapidly fattening habit, yet do not attain so great a size, as some of the same race are found to do, when raised on pastures exuberant but coarse. The late Mr. Bakewell, and the other celebrated breeders in Leicestershire and the midland counties of England, notwithstanding all their care and good feeding of their stock, have not raised the size either of the long horned, Lancashire, or Craven cattle (for these were once the same) or of that breed of sheep which was originally of nearly the same size and sort with those in the county of Lincoln. It might likely indeed

be far from the wish of these discerning and meritorious gentlemen to raise the size; but were the enlargement of the animal the natural consequence of its receiving plenty of rich provision in early life, the effect would take place in spite of their wishes. The truth is, early pampering in the case of the lower animals, not otherwise than with the human race, occasions a delicacy of constitution, prevents the bones, and consequently the whole animal, from becoming coarse and large, and induces in early life the habit and appearance of old age; which consists in a set, square make, and a disposition more or less to turn fat. The late Mr. Charles Chaplin's sheep, of the large Lincolnshire sort, by care in selecting the best, and by being put on drier and more fertile pastures than their progenitors were accustomed to, have become of a small size, fine bone, and delicate constitution, and in rapidity of growth and other respects, approach to the character of the improved Leiscestershire breed.—The chief art in improving a breed, so far as the food is

concerned, and if refinement be the improvement wanted, lies, it would seem, in supplying it with rich provision from its earliest life, during all seasons, and in a favourable or not exposed situation.

For those who rear males to let out for improving the stock of other husbandmen by coupling with them, it is right to pay attention to the early rich feeding of their own; but this might not suit with the situation and circumstances of many who keep coarser stock, and possess lands of different descriptions. In the use of their vegetable produce, such would require to be more discriminative: While they supply with inferior provision their young stock, they should reserve the better for the aged. Accordingly, it is pretty common, in the case of pasture grounds, to have two or three divisions for separate allotments of the animals. Graziers in Yorkshire, and other districts of England, have, upon this principle, the "fatting" and "following" stocks. In other situations, husbandmen class together the fatting stock with the breeding one, the dams and their

young, and they send to the coarser grounds the middle aged or rearing stock. Again, where the lands admit of it, where the possession is sufficiently extensive, and the management of pasture grounds well understood, there will be three, or more, divisions, to suit the same number of classes of live stock.

In some districts, as in Berwickshire, Northumberland, &c. (where the breeds are well selected, and the system of pasturage much improved,) with a due attention to this principle, it is found that there cannot well be fewer than three divisions of the same stock, which are sent to grounds, either naturally of different degrees of fertility, or that, by culture, or from the state of their produce, are calculated to afford provision different in quality and quantity. The best pasture is invariably given to the aged, and what should then be the fattening stock; the next best is given, to the ewes and lambs, or to the cows, calves, and cattle of the first year; and the inferior grounds are stocked with the rearing animals of either kind. It is never proper, and

not usual with intelligent husbandmen, to permit stock of all ages, any more than of all sorts, whether kinds or breeds, indiscriminately to range together.

Neither, excepting for the purpose of improving or refining a portion of the stock to breed from, would it be right to pamper them when young; because it would be throwing away what could be more profitably expended otherwise. The quantity of good aliment, necessary to fatten an animal, when young, is found to be much greater than what would be sufficient to od this, when it is more advanced in life. Young animals, then, in a possession, where there is a variety of ground, and where the businesses of both rearing and fatting are pursued, should have more succulent, coarse and bulky herbage, than older ones of the same sort; and this on several accounts—their digestive powers are stronger—there is wanted in their constitution a full supply of fluid matter, and time likewise is required for the process of their growth. Coarser breeds of animals too suit with inferior food, partly perhaps, because the progress

of their growth is slower, and the general period of their life longer, and partly for reasons already mentioned, the nature of their constitutions, the conformation of their stomachs, and other circumstances about them.

Besides these particulars, others deserve attention in breeding live stock. The food should be more or less adapted to their present condition of body. It would be very improper not to preserve in a healthy and rather plump state, all the finer and quickly maturing breeds; and it would also be wrong, if it could be avoided, to let any description of live stock get into an unduly lean or unthriving condition, from any failure in the quantity or quality of its food. Seeing, however, it might be difficult, at every season, to preserve the flocks or herds, or any parcel of live stock, in equally good plight, it would be improper to change too rapidly the food they have been accustomed to. It would be improper to reduce suddenly full fleshed or fat animals by giving them scanty or poor provision, or even, all at once, to bestow on

lean ones much nutritious food to which they were formerly unaccustomed. The impropriety in the former case must be obvious; but in the latter, to turn in lean animals to rich pasture, would not only be wasteful of the produce, but against the health of the stock. With such, too great a change, or too rich food, of which they are apt to take in over much, might hurt their digestive organs; and often live stock, otherwise thriving, receive a check from this cause, when under the management of unskilful people. It answers always well to put the lean, at first, upon less rich pasture; and as its condition improves, to introduce it to better. Expert graziers, possessing some of the best grass lands in England, never purchase for them lean stock, but usually such as are at least half fattened. They find indeed, that those who have inferior grounds, can rear common stock and make them fleshy or give them a degree of fatness at a cheaper rate, than they can do themselves; though the other cannot finish them off, or give them that full pitch of fatness that takes the market.

This circumstance, however, is now pretty generally understood, and attended to by husbandmen at all correct in their management.

Farther, whatever may be the general condition of live stock, with respect to fatness or leanness, their past habits should likewise have some share in regulating their supply of food. Indeed, the habits not of the present individuals merely, but those of their race should likewise be adverted to; for these predispose and render fit certain parcels more for one description of grounds than another, Mr. Marshall mentions, what others too may have had an opportunity of remarking, that the young of different breeds of sheep separate and draw off to different pastures; and probably this happens prior to their having any choice arising from the experience of some being better or more suitable than others. In one instance, a parcel of Lincolnshire and Norfolk lambs, dropped and suckled in the same pasture, and accumstomed to feed promiscuously, when turned into a sheep walk, divided

and drew off to different portions of it; the Lincolnshire, to the luxuriant herbage of some rich, moist land, in a low situation; and the Norfolk, to that growing on a drier, lighter soil, a sandy loam. Rural Economy of Norfolk, vol. 2. minute 75.

The habits of the race, discovered in the instincts of the young progeny, most likely deserve attention in all kinds of animals. It would not be reasonable to expect that the heavy, listless, Holstein stock of cattle, would relish the cool, airy shores where the smart Galloways are bred, or the bleaker, loftier range of the rambling Kyloes. If the habits of the race be confirmed by the mode of life to which the progeny itself has been accustomed, the adaptation of the latter to particular situations must require still more attention. It is a very difficult matter at times, to make some parcels of small Argyleshire bullocks fatten in confined inclosures during summer, when they are not only uneasy, their skin perhaps itching by the heat, but pestered with flies. It is then they derive such singular satisfaction in pass-

ing through hedges to brush their sides. Neither are such found to suit well with confinement in the house during that season. Several years ago, in company with Mr. Arthur Young, I had an opportunity of seeing some parcels of bullocks fed on cut grass, in a set of open circular sheds as well as in the house, by an eminent cultivator in Suffolk, the late worthy Mr. Hutchison Mure, and had then occasion to observe that animals of the breed last mentioned did not answer so well as others; and we were besides informed, that such generally at first received some considerable check, before they took to the provisions or became reconciled to their situation*.

* Such an application of the herbage crop is not general, the advantages attending it not being sufficiently understood. The communications on this subject by Baron D'Alten and others to the Board of Agriculture, merit attention. Some hints respecting this practice would be submitted here, were not such rendered unnecessary by a late communication on this subject in the Farmer's Magazine, published in this place by Messrs. Constable and Co. vol. 6. page 460. It is from Mr. Robert Brown of Markle, in East Lothian, a gentleman whose name alone must be suf-

In the case of sheep, it would seem that the character of the race and the habits of the individual, merit even more consideration than in that of cattle. It has been thought that some breeds, accustomed to low, luxuriant pastures, have not answered so well with the short, dry herbage in some fine sheep walks, and that, in particular, some such have been found liable to a disorder of the liver, a kind of inflamed condition, ending in a scirrhus state of that organ, *hepatitis chronica*. In other instances, and these by far the most numerous, this sort of stock suffers from an opposite kind of treatment—their being turned from dry to moist pastures, or, while on the former, exposed to eat a portion of herbage either not sufficiently nutritious, or not adapted to their digestive powers, by reason of its being, in particular seasons, too watery and poor. Various ailments may result from inattention in this respect; weak animals being a prey

ficient to secure the attention of all sensible husbandmen to this subject. It contains an account of a trial made by himself last summer, 1805.

to numerous ills. Besides certain affections of the liver, or of the lungs, there may ensue a general thraldom in the constitution, a disorder, the true rot, marked more by debility than emaciation, and by other symptoms, shewing it to be similar to what occurs in the human race from deficient or depraved aliment, and known among nosologists by the name of *scorbutus*, scurvy—by which, however, is not to be understood any cutaneous disorder.

With respect to individual animals, it need only be farther remarked, that, in proportion to the inveteracy of any habit or custom, *i. e.* generally speaking, in proportion to their age, all changes in their food and general treatment, ought to be introduced in a slow and gradual manner.

As our domestic animals consume a very large part of the produce of this island, it is an object that may conduce to both public and private emolument, to have as much parsimony introduced into this branch of business, what relates to their feeding, as can be consistent with their health, and work or

application of these animals. It is more than probable that the advantages are only beginning to be understood, which in economical management might be derived from judicious endeavours, either originally to form and regulate, or afterwards to alter, the habits and inclinations of our domestic animals in respect to their food; and that, in particular, a considerable saving might be made by attending, among others, to the following circumstances: 1. The kind and quantity of food which live stock should receive in early life; 2. The preparation of the food, and the mixture of different sorts of it together*, where-

* By the due preparation and mixture of the food, and attention to the mode of expending it, there might be a considerable saving in a costly article. Passing what concerns the preparation for the purpose of rendering it more digestible, it need only be hinted, respecting the mixture of the different sorts of food consumed by live stock, that this is a matter which deserves more consideration than it has hitherto received. It enables one to give them food of any quality, any degree of richness, succulency or dryness, &c. To horses and other animals when they are kept in the house, and have only moderate exercise, giving bruised corn, oats,

ever their nutritious quality varies much; 3. The due and regular supply of food, at all periods of their life, and in all seasons; 4. A proper or full allowance of drink; and, 5. The more constant or occasional use of condiments, calculated either to excite the action of the stomach and digesting organs, or otherwise to favour the resolution or assimilation of the food.

These particulars respecting the feeding of animals are merely suggested as merit-

beans, &c. and chopped straw or hay mixed together in a trough or manger, may be of use in another view, besides the saving thereby obtained. When fed with coarse and fine food separately supplied to them, they are apt to pine over the former, and to swallow down unchewed the latter, deriving small benefit from it. This last mischief is very certain to happen, if two animals eat together out of the same vessel, a thing that ought never to be allowed; for it occasions a very unprofitable competition and haste in eating, one animal often getting too much and the other too little. It is not unlikely what some allege, that, by mixture, one eighth of the common articles of food can be saved, and by bruising and preparing them before mixture, nearly one eighth or one tenth more.

ing notice, for it would be foreign to our present purpose to consider them particularly. Neither do they include all the circumstances that relate to the feeding of live stock; for the temperature of the season or of the situation in which our domestic animals are kept, is a material point and deserves attention in that business. A dry kind of food would seem to agree better with all animals in winter, when the perspiration is less, than in summer, during which season moister provision is more suitable. In the case of particular sorts, the food should be adapted to the nature of their exercise or work; the distance of time after feeding, when they are put to it; and its degree or duration.

These remarks having extended farther than was at first meant, it would be improper to enter more particularly on the consideration of a subject which has only come in our way, in consequence of its connection with their principal object. In conclusion, and in apology for the introduction of some particulars apparently extraneous, it may be right to mention,

that the preservation of an improved sort of live stock, howsoever acquired, whether from a foreign quarter or by a selection from the best of the home stock, or in both these ways, by crossing, will depend very much on the manner in which the animals are afterwards treated. It ought ever to be recollected, that *disease* any how induced, and especially if brought on gradually by the protracted operation of hurting powers, either on individuals or the race in general, is the never-failing source of *deformity*.

POSTSCRIPT.

Since the foregoing remarks were printed, I have received a copy of the tenth and last published volume of the Bath Society's papers, which, among a number of important communications, contain some respecting the preferable advantages of certain breeds of sheep, and particularly those attending a *small size* in live stock. One of these papers, the 31st article, gives an account of a successful claim of the Society's premium, for a superior flock of sheep, by William Dyke Esq. From what is there stated, the superior advantage derived from one breed of sheep compared with another is clearly shewn; and so far such information is well entitled to the serious attention of husbandmen in different districts. Indeed, with this view, the report of the committee concerning Mr. Dyke's flock, and the remarks which follow it, may be inserted here. Besides that, there is another paper, article 18th, upon the most profitable size of farming cattle, more directly written in favour of a small size; which, as it contains the result of the experience of a gentleman of great respectability and information, may likewise be now printed with little abridgement.

Before doing this, it may be premised, that there are delivered in these papers some observations concerning size, which, on first view, may seem not to accord with a part of the remarks already submitted, particularly in a note at page 43. One would at all times with great reluctance differ in opinion with the respectable and well informed members of that committee of the Bath Society, about the case alluded to, or with the correct and intelligent editor, in the sentiments which he has delivered on the subject in another

part of the same volume. It is however in support, not only of Mr. Cline's and the other remarks in this pamphlet, but of the opinions of many expert husbandmen in different quarters, in regard to similar instances of comparison, to observe, that though size may have, as in Mr. Dyke's case, and such others, no small influence, yet a great deal, perhaps a principal share of the superior benefit derived from the keep of the South Down compared with the Wiltshire sheep, is to be ascribed to the better make and other estimable properties of the former. The character of these two well known breeds has been described in many publications, and therefore the difference between them need not here be particularly stated. The Wiltshire, as observed by Mr. Luccock in his late treatise on wool, 'are horned animals, with perfectly white faces and legs, a flat untufted front, *a light and long carcase*, which produces no wool upon the belly and lower part of the breast; and these sheep, by their tallness,' &c. p. 272. The South Down race, again, is represented as valuable on account of its close feeding, its well formed carcase, with shorter legs, &c. Indeed the latter breed is, not only from its size, calculated to live, in an equal *weight* of animals, whatever be their number, on a given extent of short or indifferent pastures, better than the former, but, from its hardiness and the superiority of its form, it would seem more able to withstand the hardships of a bleak and barren situation, and to convert to greater use the vegetable aliment destined to its support.

The details and remarks extracted from the Bath papers, shall now be offered to the consideration of the reader, without any farther comment; the loose hints just submitted being chiefly to prevent its being supposed that there was any material difference of opinion between us respecting the comparative advantages of a small size in many, in most orts indeed, of our domestic animals.

ARTICLE XXXI.—*Being an Account of a successful Claim of the Society's Premium, for a superior Flock of Sheep, by* WILLIAM DYKE, *Esq.*

AT the General Meeting in September, 1803, was read the following report of a Committee appointed to survey Mr. Dyke's flock of Sheep, under Prem. 15, Class 3, "*for the greatest number and most profitable sort of sheep.*"

Syrencot, June 15, 1803.

It appears to the Committee, that the farm on which the sheep are fed consists of about two hundred and thirty acres of arable; and that they are generally fed on about forty acres of new field, and about forty acres of old field, together with fourteen acres of water meadow, and twenty-four of pasture; on the two latter from the beginning of March to the latter end of April *only*.

The race or breed of sheep formerly fed on this farm was Wiltshire, namely, till the year 1791; from which time the South-Down breed was substituted, and continued to the present date.

Mr. Dyke, considering that the introduction of these sheep would be an advantage to the country, was the first Wiltshire gentleman who actually introduced the breed.

It also appears, that of the Wiltshire breed Mr. Dyke supported on his farm from three hundred and twenty to three hundred and sixty breeding ewes, producing about three hundred lambs. That of the South Down or present flock, the numbers now are four hundred and sixty breeding ewes, which have produced four hundred and thirty lambs.

The lambs of the latter, as well as the turned-off ewes, produced at the markets from 2s. to 3s. per head each more than the Wiltshire.

It farther appears to us, that in supporting the Wiltshire sheep, the entire produce of the farm hath been constantly

consumed; whereas from twelve to fifteen tons of hay have been withdrawn this present season, and expended elsewhere.

The wool of the South Down produces full 6d. per fleece more than the Wiltshire.

From the preceding statement of facts, it evidently appears to us, that much *positive* merit attaches to Mr. Dyke for introducing and adopting this improvement; and, as a single claimant, recommend that the assigned premium be awarded to him by the Society.—JOHN HAYTER. W. W. PINCHARD. W. LANFEAR. THOMAS LAWES. The SECRETARY.

Comparative Statement resulting from the preceding Report.

SOUTH-DOWN FLOCK.

430 Lambs, at 32s. each	£688	0	0
15 Tons of Hay saved	30	0	0
460 Fleeces, at 6d. difference	11	10	0
100 Additional Fleeces, 3lbs. each at 6d.	25	0	0
	£754	10	0

WILTSHIRE FLOCK.

300 Lambs, at 30s. each	450	0	0
Difference in favour of South-Down	£304	10	0

REMARKS.

From the preceding report and comparative estimate, another instance seems fairly to result, in confirmation of an opinion entertained by many experienced graziers and breeders, that the smaller sorts of our domesticated animals are more profitable to the farmer than the same species of a larger kind.

Individuals of the Wiltshire breed are much larger and heavier, when in a state of maturity and fatness, than those

of the South Down; but they not only require much more time to bring them into that state, but there is also a much inferior degree of uniformity of size in a Wiltshire than in a South Down flock, both ewes and lambs. These circumstances seem satisfactorily to account for an item in the report—that lambs and turned-off ewes of the South-Down flock produce higher prices in the markets than those of the same description from the Wiltshire.

This Report was approved at the Annual Meeting, and the premium awarded accordingly.

ARTICLE XVIII.—*On the most profitable Size of Farming Cattle.* By CHARLES GORDON GREY, *Esq.*

Here a few hints from his own experience of fifteen years, are submitted by this gentleman to the consideration of the Bath Society. He observes, that the first aim of the stock breeder, as well as the grazier, ought to be—'the *one* to breed that animal whose disposition is most inclined to feed; the *other*, to produce the animal fat at an early age. By these means the supply will be greater for the consumer. The smaller animal (generally) has a more natural disposition to fatten, and requires (proportionably to the larger) less food to make it fat; consequently the greater quantity of meat for consumption can be made per acre. In *stall* feeding, whatever may be the food, the smaller animal pays most for that food. In *dry lands*, the smaller is always sufficiently heavy for *treading*. In *wet* lands less injurious. As to *milk*, the smaller animal produces more goods for the food she consumes than the greater. As to the *yoke*, where oxen are of service, the middling sized are to be preferred.

'As to sheep,' he says, 'I beg this Society to look to the premiums given for South Down sheep; where five South Down sheep to three Wiltshire have been kept on the same

quantity of acres, and on the same ground, and have annually consumed one-third less hay. This sufficiently proves the smaller animal is better for the stock breeder; and from my own observations of South Down and other different sorts of sheep, I have ever found the smaller sheep pay most for their food. I am therefore led to believe the same argument holds as good with the smaller sheep, as in the smaller beasts. If this Society will look to the *low*, *wet*, and *rich* soils of this kingdom, where large oxen have been usually fed, the graziers there (generally) are feeding Scotch, finding the smaller most profitable. And if we look to Smithfield, we find the smaller animal is always taken in preference, by the greater number of butchers. I beg also to mention *pigs*, (an animal by no means so much attended to as it ought) that invariably the smaller kind come soonest to maturity, and ever pay most for their food at *any* profitable age. The consumer must be ever advantaged by the smaller animal, it having proportionably much less offal. Of *horses*, I need not observe the larger animal has but its *particular* use; the middling must, for *general* use, be ever preferred. C. Gordon Grey.

Tracey Park, 1804.

Mr. Matthews, the editor, subjoins to this article several judicious remarks on the same subject. He informs the public, that 'among the different objects of improvement to which the attention of this Society has been long directed, none has been more remarkable than that of improving, on sound and general principles, the various kinds of *Live Stock;* an object confessedly of great moment. The ardour which the Society has evinced under this head, had been excited by the prevalence of an opinion, which in many instances seemed to be gaining ground, that the largest races of animals were the most profitable to the farmer, as paying most

for the food they ate. An opinion that appears to have derived considerable countenance, of late years, from the frequent instances of premiums and bounties given by the amateurs in London for samples of large animals, produced at the Smithfield meeting. Strong suspicions of the soundness of this doctrine having taken place in the minds of some practical men concerned in fatting stock, very useful experiments have been accordingly made. In many instances it had been obvious that too many of the favourers of large animals, though professing to calculate on the profit of the food consumed, had not in reality so done; but were deceived by attending to the most striking feature of the business, the nominal profit *per head*, instead of closely calculating the aggregate advantage *per acre*, which is certainly the true criterion. This latter mode of calculation, requiring accurate comparison of one race against another, seems to have involved too much care and extent of comparative *account* to have been pursued in general practice, and to general conviction. Some gentlemen may be of opinion, (which indeed seems to have been the fact) that differences of profit in favour of large animals, especially horned cattle, will be occasioned by local circumstances, as of very rich and luxuriant lands, or lands abounding with very strong grass. But admitting, for argument's sake, though not granting, that this may be the case in some few districts, it is obvious that the doctrine could not apply generally, because such lands are not generally found, but the contrary. The fact of such advantage being obtained may however be doubted on *any* land. And unless it could be proved that strong luxuriant food cannot be so closely eaten down and consumed by a larger number of small or middle-sized animals, as by a smaller number of large ones, the preference of the latter to the former would remain doubtful in theory; while practice, carefully conducted, might prove the reverse.

That practice has proved this to be the case, wherever it has been fully and fairly tried, is the point now contended for. From this conviction in the minds of competent men, has arisen a zeal for the further extension of their knowledge, founded on experience. To facts of this sort they have been induced to add what has appeared to them the *rationale* of the system they have adopted. Among these, the writer of the foregoing summary observations, Mr. Grey 'comes forward for the purpose of laying down axioms for general consideration, and of course for general benefit. The respectability of his name will not fail to add weight to his communication; and on that account it is given to the public.' EDITOR.

See '*Queries on the means of judging of Sheep*,' signed '*A. Y.*' in Annals of Agriculture, vol. XVIII. p. 524, &c.

These queries by Arthur Young, Esq. now Secretary to the Board of Agriculture, a gentlemen of great information and indefatigable zeal for the promotion of husbandry, demonstrate how very difficult it is to form an accurate and just estimate of the comparative merits of different breeds of sheep and other live-stock.

This gentleman is well aware of the advantage that might result from such an investigation. 'I cannot conclude,' he says, 'without observing, that the importance of improving the breeds, of whatever kind, is greater than may be at first imagined; for reckoning the sheep of England only at twenty-five millions, if their return was raised only 1s. a-head, the improvement would amount to 1,250,000l. annually; and those who have paid attention to these subjects, must be sensible that the double is a very trifling rise indeed, on comparison with what has been effected in various districts.'

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