

furrows. All useless hedges have been removed, old ditches and water-courses filled up, and the arable land has been deeply cultivated and well cleaned.

Under this treatment the improvement in the texture of the soil and the character both of white straw and green crops has more than realized my expectations.

I had the satisfaction during the past week of inspecting the estate. The outlets from the clay-lands were then discharging at the rate of 2700 gallons per acre per diem, and I was informed by Mr. Scott, the bailiff, that during the late heavy rains no water had stood upon the surface.

I am induced to hope that the publication of these results may tend to remove any local prejudice which may still attach to undrained land of as unpromising a character as that of Hinxworth, more especially as I am permitted to add, that the clay-land farm has been let within a few days on terms securing a full return for the capital expended in draining, and the several judicious improvements carried out by Mr. Clutterbuck, to which I have already alluded.

52, *Parliament Street, Westminster,*
December 30th, 1859.

XVI.—*On Cross Breeding.* By W. C. SPOONER, M. R. C. V. S.

It cannot be denied that the natural laws by which the preservation of animal species is effected are involved in considerable mystery, and though the subject is well worthy the attention and study of the practical man as well as of the physiologist, experience is yet fraught with so much contrariety that attempts to lay down any certain guide on it have for the most part been received with considerable distrust. No sooner does the inquirer imagine that he has discovered some particular principle which obtains universally, than he is met by circumstances which apparently upset his previous conclusions. The maxim "*like begets like,*" for example, is a rule having very extensive sway, yet, as propagation is the work of two parents, the respective influence of the one or the other is a matter involving considerable diversity of opinion, and prevents anything like a certain conclusion being arrived at. We cannot do better than consider, on the very threshold of our subject, the respective influence of either parent; for on this the merits of pure or cross breeding must principally depend. The most probable supposition is, that propagation is done by halves, each parent giving to the offspring the shape of

one half of the body. Thus the back, loins, hind-quarters, general shape, skin, and size, follow one parent; and the fore-quarters, head, vital and nervous system, the other: and we may go so far as to add, that the former in the great majority of cases go with the male parent, and the latter with the female. A corroboration of this fact is found in the common system of putting an ordinary mare to a thorough-bred horse; not only does the head of the offspring resemble the dam, but the forelegs likewise, and thus it is fortunately the case that the too-frequently faulty and tottering legs of the sire are not reproduced in the foal, whilst the full thighs and hind quarters which belong to the blood-horse are generally given to the offspring. There is, however, a minority of cases in which the opposite result obtains. That *size* is governed more by the male parent, there is no great difficulty in showing;—familiar examples may be found in the offspring of the pony-mare and the full-sized horse, which considerably exceed the dam in size. Again, in the first cross between the small indigenious ewe and the large ram of another improved breed—the offspring is found to approach in size and shape very much to the ram. The mule offspring of the mare also very much resembles both in size and appearance its donkey sire.

These are familiar examples of the preponderating influence of the male parent, so far as the external form is considered. To show, however, that size and height do not invariably follow the male, we need go no further for illustration than the human subject. How often do we find that in the by no means infrequent case of the union of a tall man with a short woman, the result in some instances is that all the children are tall and in others all short, or sometimes that some of the family are short and others tall. Within our own knowledge, in one case, where the father was tall and the mother short, the children, six in number, are all tall. In another instance, the father being short and the mother tall, the children, seven in number, are all of lofty stature. In a third instance, the mother being tall and the father short, the greater portion of the family are short. Such facts as these are sufficient to prove that height or growth does not exclusively follow either the one parent or the other. Although this is the case, it is also a striking fact that the union of tall and short parents rarely, if ever, produces offspring of a medium size—midway, as it were, between the two parents. Thus, in the breeding of animals, if the object be to modify certain defects, by using a male or female in which such defects may not exist, we cannot produce this desired alteration; or rather, it cannot be equally produced in all the offspring, but can only be attained by weeding out those in whom the objectionable points are repeated.

We are, however, of opinion that, in the majority of instances, the height in the human subject, and the size and *contour* in animals, is influenced *much more by the male* than the female parent; and, on the other hand, that the constitution, the chest, and vital organs, and the forehead generally, more frequently follow the female.

We have dwelt on this point the more because on it hinges the difficulty of effecting certain improvements in breeding by means of crossing, and the still greater difficulty of establishing a new breed by such means. So great is this difficulty that many breeders, finding their attempts at such improvements so frequently baffled, or observing this to be the case in the practice of others, cling with superstitious tenacity to the doctrine of *purity of blood*, believing it to be the *Ark* in which alone true safety is to be found.

Now *pure breeding*, which, when carried to an excess, is called *in-and-in* breeding, has its advantages as well as its disadvantages. Its friends observe with great force, that when we have in breeding reached great excellence, it is folly to risk the loss of such excellence by means of crossing; and the more so as the defects of a parent may disappear in a first or second, and reappear in the third or fourth generation; "*breeding back*," as it is commonly termed. A friend of the writer's, Mr. John Clark, of Lockerly, a strenuous advocate of pure breeding, observes that a correspondent in Suffolk informs him, that he had seen the cross tried between the old Norfolk and Down sheep, and the first cross was admirable, but they soon became disproportioned and unsightly; also the Down and Leicester in some midland counties figured for a time, and then for the same reasons were given up, and such he thinks will be the fate of the New Oxfords, or the mixture of the Cotswold and the Down. He adds, that for the last four years he has used rams from the cross with Down ewes, and the offspring have answered his purpose for *fattening* lambs, but one lamb in ten presents unmistakable evidence of its mongrel origin.

Again, it is urged that great excellencies can only be perpetuated by union with similar excellencies, and beyond all this that there is a certain amount of advantage from an unstained lineage—from the very possession of breed, as it is designated. The objectors to *in-and-in* breeding urge, that by so doing we engender weakness of constitution, diminution of size, hereditary diseases, and also a tendency to barrenness; but it is argued in reply to such objections, that they occur from want of sufficient care in weeding out defective animals, whether as respects constitution or size. It is a well-established fact, that in

the human subject too close affinity, such as the intermarriage of cousins, tends to mental diseases and consumption; and we can readily imagine that when there is a tendency to such diseases in a family, this tendency must be greatly increased by intermarrying with a member of the same family. Animals not being subject to mental diseases, the observation does not apply to them with the same force, but it is true in a lesser degree. At the same time, unless the choice is extremely confined, most of the evils of pure breeding can be avoided by careful selection and rigorous weeding. Examples of pure breeding are familiar to us in the admired race-horse, the first-class short-horn, and the South-down sheep; but, so far as purity of breed alone is considered, the mountain sheep of Wales, the Highland Scotch cattle, and the Shetland or Welch, are equally pure; but whilst the latter have been propagated without care or attention, the former have, by careful selection and rigorous weeding, been considerably enhanced in value. A striking example of long continued pure breeding is afforded by the Leicester flock of Mr. Valentine Barford, of Fosote near Towcester, who has the pedigree of his sheep from the day of Bakewell in 1783 to the present time, and since 1810 he has bred entirely from his own flock, sire and dam, without an interchange of male or female from any other flock. He observes, "that his flock being bred from the nearest affinities—commonly called in-and-in breeding—has not experienced any of the ill effects ascribed to the practice." His flock is remarkably healthy, and his rams successful, but his sheep are small.

Let us pause for a few minutes to consider what constitutes *breed*, or rather what is meant by high breeding. We shall find that it refers to very different desiderata in different breeds. In the thorough-bred horse it signifies a very high development of the muscular and nervous systems, accompanied by such mechanical structure as when united with it constitutes the highest manifestation of speed and endurance. In the ox, however, it implies very different qualities, viz., early and rapid growth—the development of flesh or muscle on the parts most prized for food—a disposition to lay on fat; these, with the possession of the smallest amount of bone consistent with strength and health, are the principal characteristics of a well-bred animal. Instead of the highly-nervous temperament of the race-horse, we have here a quiet lazy disposition; in fact, a lymphatic temperament, by the influence of which the digestive organs reign supreme, and convert for the public benefit a given quantity of food into the utmost amount of flesh and fat. The same observations apply with equal force to the sheep, and in a still stronger degree to the pig. A well-bred pig is the incarna-

tion of everything indolent and lethargic, and the very antipodes of that high organization and nervous development which belong to a high-bred horse. Examples of pure breeding are probably to be found in greater perfection in cattle than in sheep. The *Devon* and *Hereford* cattle have descended through many generations in unbroken lines, and owe the perfection which they have attained to careful selection. The *Short-horns*, although considerably more modern in their origin, and moulded into their present form by a series of successful crosses, have yet been preserved pure with even more rigorous care than the other breeds which we have mentioned. The solid frame and great feeding properties of the *Herefords*—the quality of beef and richness of cream, as well as working properties of the *Devons*, are well known and generally appreciated; and yet these qualities are insufficient to resist successfully the encroachments of the *Short-horns*, whose early maturity and disposition to lay on both flesh and fat, joined with fair milking properties, are such that they outnumber both the other breeds combined. As, however, the leading purpose for which a breed of cattle is kept is generally well defined, whether for the purpose of the dairy, or for that and early fattening, or simply for beef or for working as well, and, as each of these purposes can be well attained by keeping a pure breed, there is not the same temptation or inducement to cross, which is often experienced in sheep-farming, in order to insure specific advantages which cannot otherwise be attained.

This being the case, we may most advantageously devote our remaining space to the practice of crossing, as illustrated in sheep-breeding. We may start, then, with this principle, that to cross for crossing sake is decidedly *wrong*; that, unless some specific purpose is sought for by crossing, it is far better to cultivate a pure breed. The country is, indeed, under great obligations to those gentlemen who carefully preserve their breed intact, and endeavour to improve it by weeding and selection. We can readily excuse their prejudices, if they have any, and have no wish to interfere with their creed. Let theirs be the office to preserve our fountains pure and undefiled, and to supply others with the best sources of improvement by crossing. And we do not confine our praise to those merely who, keeping in the high road of fashion, have succeeded in securing, both by prizes and prices, a full and sufficient reward for their labours, but would award it to those also who, keeping perhaps in the second rank, have yet supplied their neighbours and the public with valuable pure-bred sheep at moderate prices.

History fails to supply us with the origin of our various breeds of sheep; but we doubt not that, for many centuries after

the time of the Romans in this country, certain distinct breeds were perpetuated, with little improvement and little change. The progenitors of the present Southdown or Sussex breed, inferior as they were to their descendants, ranged probably, in the days of the Romans, over the Southdown hills; whilst another breed, now happily extinct, occupied for the most part the hills and downs of Wiltshire and Hampshire. A large, bony, narrow, but active sheep, with large heads, Roman noses, and long curly horns, high in the withers and sharp in the spine, but yet the largest short-woolled breed in existence, were the denizens of these counties during the last century.

In Wiltshire, although they remained as a pure breed much longer than in Hampshire, yet, as far as can be learnt, they were supplanted by the Southdown, whose superior qualities displaced the old Wiltshire altogether; and we are not aware of any instances in which they were crossed, except for the purpose of crossing them out by using again and again the Sussex ram. Mr. James Rawlence of Bulbridge, near Wilton,



THE OLD WILTSHIRE SHEEP.—1. Ram bred by Mr. Porter, Hindon, Wilts. 2. Ewe from the same flock. For sheep of any of the other pure or cross breeds mentioned in this Essay the reader is directed to the show-yard at any of our agricultural meetings. The old Wiltshire sheep is, however, now extinct; and the above engraving is therefore given of it. It has been reduced, by permission of Messrs. Longmans, the publishers, from a plate in Professor Lowe's work 'On Domesticated Animals.'

whose large practical experience, both as sheep-breeder and land-agent, stamps his authority with considerable weight, observes in reply to the author's inquiry, "The last flock of this breed (old Wiltshire) disappeared about the year 1819, and the substitution of the Southdown commenced late in the last century. In many cases Southdown ewes as well as rams were brought out of Sussex to replace the horned flocks, but in numerous instances the two breeds of sheep were crossed, and by the continued use of the Southdown ram the chief characteristics of the horned breed were merged in the Downs. The cause of the very rapid substitution of the Down for the Old Wiltshire may be found in the fact of the large number of enclosures of common fields which then took place. The sturdy horned wether was thoroughly competent to take care of himself when the system of feeding in common prevailed, but when each farmer could keep his flock separate, an animal of superior quality was preferred."

In Hampshire, on the other hand, where the same sheep prevailed and were valued for their hardihood, and their powers of travelling far, and folding hard—properties so valuable when the fertility of the light soils was mainly kept up by these useful manure-carriers—these sheep were extensively crossed. Previous to the close of the last century, the South-down sheep had been greatly improved by careful selection, and the name of the late Mr. Ellman was well known for his eminent services in bringing out and improving the latent qualities of this valuable breed. About the beginning of the present century the sheep-breeders of North Hampshire began to bestir themselves, and a few enterprising farmers procured some rams from Sussex, of the Southdown breed. Finding the experiment successful, it was repeated again and again, care being taken to select the largest, coarsest, and *blackest*-faced rams, which it was thought would suit the coarse sheep with which they had to amalgamate. How many crosses with the pure Sussex were used we cannot ascertain, but enough materially to alter the character of the breed, to cause the horns to disappear, and to change the colour of the face from white to black; and, with these changes, to impart a more compact frame, a broader back, rounder barrel, shorter legs, and superior quality altogether, and yet preserving the hardiness and the disposition to make early growth, which the original flock no doubt possessed, and with it the large heads and Roman noses, which form so distinguishing a characteristic of the Hampshire Downs, and which are unquestionably derived from the original breed. Indeed, it is only necessary to inspect a drawing of the original Hampshire or Wiltshire sheep to become thoroughly satisfied as to the source from whence is derived the colossal head which some fifteen years since was

regarded as, I will not say an ornament, but an indispensable appendage of the breed. Uniformity of colour is also a great point with most Hampshire breeders, with what amount of advantage we cannot say, but black tips to the ears as well as black faces are deemed essential, and any crossing with speckled-faced sheep, such as the Shropshire, is in consequence viewed with dislike.

It was not until the Wiltshire sheep-breeders began to produce some large but more symmetrical animals that the Hampshire men began to consider whether it was not possible to reduce the size of the heads, without losing the characteristics of the breed. By attention and careful selection this has been accomplished, and we have now a breed of sheep which is admirably adapted to the present system of fattening off at much earlier ages than formerly, and, for the most part, as tegs and two-teeth sheep. It is certainly not owing to any aristocratic patronage that the Hampshire sheep have forced their way into public estimation. They have neither been upheld by agricultural societies or agricultural writers, nor have they been launched into public favour as winners of prizes; on the contrary, they have been laughed at, criticised, and condemned; and yet they have not only held their own, but have spread far and near, so that the county in South England where none are to be found is probably the exception, not the rule. The Hampshire sheep may, therefore, be instanced as an example of successful crossing, and as a proof of what can be done by the male parent, in changing, in very few generations, the character of the original, and yet retaining some of its good qualities, thus forming a breed more intrinsically valuable than either source from whence it is derived. It has been truly said that the public is wise though composed of fools; and undoubtedly, when the pocket is concerned, the decision of the public is, for the most part, correct. Thus at the various autumnal fairs large lambs are in the greatest request, and command the highest prices, which in itself is a sufficient proof that with a given amount of food they make a greater quantity of mutton. It was found indeed by Mr. Lawes, in his careful and valuable experiments, that the Hampshire sheep, although they were surpassed by the Cotswold, yet exceeded the Southdown in the amount of mutton raised from a given weight of food. The greater economy of fattening a young over an old animal may be readily explained by the fact, that whilst the latter increases in fat alone, the former does so both in flesh, fat, and bone, and thus the latter can assimilate a greater amount of the nutritious properties of the food, and is consequently a more profitable feeder.

We have no reason to suppose that after a few generations the Hampshire breeders continued to use the Sussex rams; as soon as the horns were gone, to which, perhaps, the Berkshire Notts contributed, and the face had become black, they employed their own cross-bred rams with the cross-bred ewes. If, then, we were asked what original blood predominated in the Hampshire sheep, we should unquestionably say the Sussex; but if the further question were put, Is the present breed derived from the Sussex and the original Hampshire alone? we should express a doubt as to such a conclusion, as there is good reason to consider that some improved Cotswold blood has been infused. Some thirty years since a Hampshire farmer still living (Mr. John Twynam) used the improved Cotswold ram with his Hampshire ewes, and the first cross exhibited a remarkable proof of the preponderating effect of the male. The produce, in size, general appearance, and wool, partook far more of the ram than of the ewe, and it was thought that a most valuable breed had been obtained, which, with the increased size, and weight of fleece, and disposition to fatten of the Cotswold, would combine the hardiness and folding capabilities of the Hampshire. It was found, however, no easy task to perpetuate such a breed after the first cross—the defects of the one parent or the other would appear and reappear in the second and third generation, and it was only by careful weeding that anything like uniformity could be attained. Mr. E. G. Young, of Broadchalk, Wilts, a close observer as well as an excellent farmer, informs the writer that he, as well as his brother, purchased Mr. Twynam's rams for several years, and has, he conceives, derived advantage from the cross. Mr. Rawlence observes, that the points he has arrived at have been to produce an animal yielding at an early age the largest possible amount of mutton and wool, which he considers the *sine qua non* of sheep breeding; and he adds, it is difficult to estimate the enormous increased production which has within the last few years been obtained by keeping this object steadily in view. Whilst he highly appreciates the high-bred Southdown, he is convinced that the present system of farming demands a larger description of sheep, and one which will produce a heavy weight of wool at an earlier age, and he is not quite sure whether a cross with Cotswold would not produce a more profitable animal. The absurd fashion of drafting good sheep, if they have not black faces and ears, tends to retard the improvement of the carcase. After some few years a change of farm and other causes led to a discontinuance of the experiment, yet many of the cross-bred rams were sold and let to sheep-breeders both in Hamp-

shire and Wiltshire; and although after dipping once or twice into this breed they then ceased to do so, yet they have continued breeding from descendants of the cross, and thus, in very many of the Hampshire and the Wiltshire flocks, there is still some improved Cotswold, and, consequently, Leicester blood.* Probably an increase of wool has thus been obtained. Some say that on the borders of Berkshire the Berkshire Nott was also used, and others contend, although without proof, that a dip of the Leicester has been infused. Be this as it may, there is no doubt that, although for some years past the Hampshire sheep have, for the most part, been kept pure, yet they have been very extensively crossed with other breeds before this period.

We cannot do better than let Mr. Twynam speak for himself on a matter on which he has bestowed considerable attention during a period of ten or twelve years. In a paper he has recently read before a Farmers' Club—after some observations on the respective merits of the Cotswold, the Leicester, the Southdown, and the Old Wiltshire, or Hampshire, from all which sources the present breed is derived—he states that his idea was to blend these various breeds together, which he did by using the improved Cotswold ram (Cotswold and Leicester) with the Hampshire Down ewe. As a proof of the value of the cross, he observes,—“I have the written documents of the feeder of one hundred tegs sold in 1836, the wool and carcasses from which returned 400*l*.” By using this cross an earlier maturity is gained than by either breed separately. He observes:—“The Leicester and Cotswold will become large, heavy, and fat on the outside, but not inwardly, as yearlings; very few Downs will at that age be sufficiently advanced for slaughtering, from their known disposition to arrive more slowly at maturity.” What, then, is wanted is young sheep, large, heavy, and well furnished at a year or fourteen months old, and this object is attained by the cross, as the testimony of the butchers who bought the sheep will show. He continues,—

“You must have observed an immense improvement in the character of the Hampshire sheep generally within the last fifteen or twenty years—an increase of size, a heavier fleece of a longer staple, with a kindlier touch, evidencing a greater aptitude to fatten. I have had my attention called to this fact frequently since I have ceased to be a breeder. How has this altered character

* It is, we believe, generally acknowledged that the Cotswold sheep have been improved by crosses from the Leicester ram; and although the origin of the latter is involved in some obscurity, yet it is generally supposed that Bakewell, the founder, whilst he used the original Leicester or the long-wooled breed, which prevailed mostly in the midland counties, as his foundation, crossed them with various other breeds until he succeeded in establishing the superiority of excellence which he afterwards sought to maintain by pure exclusive breeding.

been obtained? Can we recognise none of the Cotswold fleece or his more symmetrical proportions? And, when I tell you that, in the years 1835-36 and subsequent years, I sold very many half-bred rams, not only into Hampshire Down flocks generally, but into those of six or eight of our first ram-breeders whose names are at this day to be seen upon my books; when you must be aware that these breeders are in the constant annual habit of selling one to another in this and adjoining counties; I trust I may without presumption lay some little claim to having supplied a portion of the material from which our present flockmasters have worked up a better and more valuable fabric."

It is a curious fact that, whilst the system we have detailed has been followed in Hampshire, a very different plan has been adopted in the neighbouring county of Wiltshire. Here the same large, flat-sided, uncouth horned sheep, whose ancestors were its denizens in the days of the Romans, ranged over the Wiltshire Downs, and indeed, retained possession some years later than in Hampshire. They at length succumbed to the superior qualifications of the Sussex Downs which gradually displaced them, not by crossing them out so much as by being substituted in their place, and thus the imported Sussex became the West Country Down. At length a larger sheep and particularly a larger lamb was demanded, and then the Wiltshire breeders procured rams from Hampshire and greatly improved their flocks in size, and secured larger lambs. Beginning with Sussex ewes, they have increased the size of the frame without materially enlarging the heads, and thus a very valuable breed of sheep has been formed, the Wiltshire Down, whose more perfect symmetry frequently enables their owners to wrest the prizes from the Hampshire men, and to cause the latter, by the rivalry thus induced, to improve the symmetry of their sheep by careful selection. The *Wiltshire Down* breeders, therefore, began with the Sussex ewe, and crossed with the Hampshire ram, whilst the Hampshire breeders used the original horned ewe and the Sussex ram. The latter, therefore, have less of the Southdown than the former, and, though of greater size and producing somewhat larger lambs, have less symmetry.

Mr. Rawlence, whom we have before quoted, informs the writer:—

"The original flock from which my present sheep are chiefly descended, was of the Sussex breed and of moderate quality. I commenced by drafting all the small and delicate ewes, and the remainder were crossed with rams of the Hampshire breed. I bred from their produce for two or three years, and then had another cross with the Hampshire, still continuing to cull defective ewes. After I had obtained considerable size from the infusion of the Hampshire blood, I had recourse to some rams bred by Mr. Humphrey of Chaddleworth, Berks, which were the produce of the biggest and strongest Hampshire ewes by a sheep of Mr. Jonas Webb's. I use my own rams, and I also frequently purchase a few of the best Hampshire ewes I can get, put my own sheep to them and use their lambs. I also put a sheep of Mr. Humphrey's to some of the best

of my ewes, and select rams from their produce, thus getting fresh blood without making an entire cross."

Our account of the Hampshire sheep would be by no means complete unless we noticed the sheep of Mr. William Humphrey, of Oak Ash, near Wantage, Berks, specimens from whose flock have so frequently been prize-winners, and their services generally acknowledged by other improvers.

Mr. Humphrey, in a communication to the writer, has furnished the following interesting history of his sheep, which shows that, although they may be correctly designated the Improved Hampshire Downs, they are yet *sui generis* and distinct from any others, and may be considered peculiarly his own:—

"About twenty-five years since, in forming my flock, I purchased the best Hampshire or West-Country Down ewes I could meet with; some of them I obtained from the late Mr. G. Budd, Mr. William Pain, Mr. Digweed, and other eminent breeders, giving 40s. when ordinary ewes were making 33s. to 34s., using the best rams I could get of the same kind until the Oxford show of the Royal Agricultural Society. On examining the different breeds exhibited there I found the Cotswolds were beautiful in form and of great size; and, on making inquiries as to how they were brought to such perfection, I was informed that a Leicester ram was coupled to some of the largest Cotswold ewes, and the most robust of the produce were selected for use. The thought then struck me that my best plan would be to obtain a first-rate Sussex Down sheep to put to my larger Hampshire Down ewe, both being of the short-woolled breed. I thus determined to try and improve the quality and form of my flesh, still retaining the size and hardihood so necessary for our dirty low lands and cold exposed hills. With this object I wrote to Mr. Jonas Webb to send me one of his best sheep, and he sent me a shearling by his favourite sheep Babraham, which made some good stock out of my large ewes. I went down the next two years, and selected for myself; but the stock did not suit my taste so well as the one he sent me, and I did not use them. I then commissioned him to send me his sheep which obtained the first prize at Liverpool; and from these two sheep, the first and the last, by marking the lambs of each tribe as they fall, then coupling them together at the third and fourth generation, my present flock was made. Not having used any other blood on the male side for more than twenty years, I found some difficulty at first, when putting the first-produce ram to the first-produce ewe, the lambs coming too small to suit my customers. To obviate this difficulty I drafted out the finest and smallest-bred ewes, replacing them with the largest Hampshire Down ewes I could meet with that suited my fancy; still continuing to use the most masculine and robust of my rams to keep up my size. Some of my friends advised me to use a large coarse sheep to these small ewes to remedy the defect; but the larger ewe seemed to me the better way, and that course I pursued. I got rid of my smallest ewes and replaced them with large ones, which gave me what I thought to be an advantage—the using no male animal but of my own blood, the pedigree of which I am now acquainted with for more than twenty years. It has succeeded hitherto beyond what I could have expected. My object has been to produce a Down sheep of large size with good quality of flesh, and possessing sufficient strength and hardiness to retain its condition while exposed in rough and bad weather to consume the root-crops on our cold, dirty hills. Independently of the value of the Hamp-

shire or West Country Down in an agricultural point of view for such localities as ours, they produce when slaughtered a valuable carcase of mutton, giving the consumer a good proportion of flesh to the fat, which is a point that may be too much lost sight of. I will, in proof of it, relate an instance which a gentleman told me the other day. When residing in another county he sent to his butcher for 3 lbs. of mutton. The fat seemed so much out of proportion to the lean, that he had the curiosity to weigh the lean. After carefully cutting it out, he found it to weigh $\frac{3}{4}$ lb., or only one-fourth of the whole. This anecdote indicates to those who are attempting by crosses to establish a new breed, or to improve an old one, the importance of producing an animal in which the flesh forms a due and sufficient proportion of the whole."

In Dorsetshire the same system has been pursued as in Wiltshire, although more recently and to much less extent.

In the eastern part of the county the Wiltshire system of crossing has been followed with still greater latitude. The object being to secure size without coarseness, the rams of the Hampshire as well as the Sussex are each used, as the fancy of the breeder may direct. In one flock, well known to the writer, of very good repute—so much so, that an annual sale of rams and ram-lambs takes place, and for several years past has been very successful—the owner, whose flock was originally Southdown, has increased the size of his sheep by means of the Hampshire ram, but does not hesitate to avail himself of the Sussex from time to time to counteract, as he says, any tendency to sourness, and also uses the choicest of his own breed as well. Here is an evident cross, carried to a considerable extent and with great success, as the high price realized by the sale of fat tegs sufficiently testifies. Other breeders in this county adhere firmly to the Southdown, which they seek to improve by using first-class rams; and the superior quality of their fleece, as compared with the Hampshire, forms no small part of their motives for so doing. Some years since the Southdown sheep in Dorsetshire received a cross from the Devon or Bampton Nott, a large long-woolled sheep, but with a good disposition to fatten. The cross was approved of, and the produce were used by other flock-masters, which circumstance has perhaps rendered the Dorsetshire Southdown somewhat larger than the Sussex.

The *Dorset horned* sheep, so valuable for their early lambs, some fifty or sixty years since reigned supreme over the Dorsetshire Downs. They were then in many instances supplanted by the Sussex, which were found better suited for folding, and were more esteemed for their mutton. Crossing was tried in many instances, but although the half-bred lamb from the Dorset ewe was and still is in great request for early lamb, yet the breeds did not assimilate well; they were as a flock inferior to their parents, and were consequently discontinued; and whilst the Dorset held their own in the west, the Southdown took their place in the eastern

part of the county, and of late years have, in many instances, been crossed by the Hampshire ram.

The Dorset horned sheep is, however, a much superior animal to the old Wiltshire and Hampshire. Shorter on the legs, with a more compact frame and a rounder barrel, this sheep, besides its peculiar value for the production of early lamb and its remarkable prolific qualities, is by no means to be despised for its feeding properties. It is not unusual for these sheep — as well as the kindred though somewhat larger Somersetshire — to be brought into the market in March and April together with their lambs and sometimes pairs of lambs, all fit for the butcher at the same time. The Dorsetshire and Somersetshire sheep are raised on tolerably good land, where they have been preserved pure and improved by selection.* It is usual, however, to put the ewes that are intended to be sold to the Southdown ram, which improves the quality and fattening predisposition of the lamb, and the ewes are usually sold at the Hampshire October fairs, by which time they are very forward in lamb. The buyers of the ewes, although the usual custom is to sell off the ewe and lamb the following spring, sometimes keep a portion of the ewes another year, putting them again to a black-faced ram. It is remarkable that these ewes are not only exceedingly prolific and rarely have any mishap in yeaning their lambs, but will carry on all the functions of maternity whilst almost fat themselves. In South Hampshire, which is celebrated for the excellent quality of its early lamb, this system is carried out to perfection, particularly with the Somersetshire ewe. The drawback to this breed of sheep, as compared with the Hampshire and Southdown, is the longer period required for their maturity, the richer food required, and the somewhat inferior character both of the mutton and the wool.

To return, however, to our proper subject, we may observe that various attempts were made some years since to introduce the merino blood, with the idea that great benefit would be derived from the increased quantity and the superior fineness of the wool; and undoubtedly, if the carcass of the Southdown and the wool of the merino could be united in the same animal, the acmé of sheep-breeding would be attained. It was found, however, that the quality of the wool was not a sufficient recompense for the want of early maturity and feeding properties; and at length, after many trials, the merinos disappeared by the continued use of other rams. It is very possible, however, that they

* The Dorsetshire flocks have of late years been crossed and improved by the larger Somersets, so that pure flocks of the former are now rare, and the distinction of the two breeds by the colour of the nose has almost disappeared.

may have left behind them some improvement of the fleece, for it is equally difficult in breeding to get rid of a virtue and to wash out a stain. We have confined our examples of cross breeding pretty much to the breeds of our own locality, but it must not be forgotten that other counties have also some noble specimens of cross-bred sheep. Shropshire is celebrated for its breed of sheep, and under the new regulations they compete very successfully at our annual shows. At the Chester meeting they beat the Hampshire Down as old sheep, but in their turn were conquered by the latter in the younger classes. They present themselves to our notice in a more compact form; though shorter, they are wider, broader on the back and deeper through the heart.

This breed was first brought into national repute at the Shrewsbury meeting in 1845, when it was wisely held that it was no longer desirable to confine the honours of the Society to a few particular breeds. The new class "Shortwools not Southdowns," brought into competition with each other, the Hampshire, the Shropshire, and the West Country Down or Wiltshire; and thus, although the labours of the judges were rendered somewhat onerous, yet much good was effected, and the public have greatly appreciated and promoted the various breeds so brought into notice.

The Shropshire originally sprang from a breed called the Morfe Common sheep, and owe most of their great and improved qualities to careful selection. We imagine they would make a very good cross with the Hampshire Down, and might somewhat improve the carcase of the latter, as well as the quantity and quality of wool in the flocks of those breeders who do not attach too much importance to the colour of the face.

The Shropshire speckled-faced sheep is undoubtedly a cross-bred animal, and indeed affords a striking example of the perfection that can be derived by a judicious mixture of various breeds. At a late meeting of a Farmers' Club in this county, Mr. J. Meire observed, "It is not attempted to be denied that the Shropshire is a cross-bred sheep: the original breed was horned, and the first attempt at improvement was to get rid of these incumbrances, and there is little doubt that this was effected by a cross of the Southdown. This sheep was well adapted for the downs, but for the enclosures of Shropshire something more docile was required, consequently, recourse was had to the Leicester." This crossing and recrossing at length gave place to the practice of careful selection, and thus uniformity was sought for and attained, and the present superior breed was established. It is now held that no further cross is required.

The New Oxfordshire sheep is a very valuable breed, originating from a cross between the improved Cotswold and

the Hampshire or West Country Down. Their size being less than the Cotswold, they are better adapted for the ordinary management of a light land farm. This breed is very similar to that first introduced by Mr. Twynam, to which allusion has been made, but probably the Southdown has been used as well as the Hampshire Down.

Although Mr. Twynam may perhaps have a claim to priority in crossing the Hampshire Down ewe with the Cotswold ram, yet from various causes, and probably because the Hampshire hills were scarcely adapted for such large sheep, they failed to establish themselves in this locality; whilst a very few years afterwards a similar experiment was tried in Oxfordshire, and, whether from a milder climate, more fertile pasturage, or other causes, the result was a complete success.

Mr. S. Druce, of Eynsham, Oxon., favours the writer with the following short communication on the subject:—

“The foundation of this class of sheep was begun about the year 1833 (see vol. xiv. p. 211,* of the Journal of the R. A. S. E.), by using a well-made and neat Cotswold ram with Hampshire Down ewes. At the same period several breeders of sheep in this neighbourhood also tried the experiment; consequently there has always been an opportunity of getting fresh blood by selecting sheep which suited different flocks, and thereby maintaining the uniform character which is now established.

“As to the result of this crossing I would refer you to the names of the following, who usually exhibit at the “Smithfield Club” Show, viz. :—Messrs. John Hitchman, Little Milton, Oxon.; William Gillett, Brize Norton, Witney, Oxon.; W. Hobbs, Minsey Hampton, Gloucestershire; A. Edmunds, Longworth, Berks; J. B. Twitchell, Wilby, Northamptonshire; C. Howard, Bid-denham, Beds; William Hemming, of Caldecot, near Moreton-in-the-Marsh, Gloucestershire, &c. &c. And amongst ram breeders I would name J. Hitchman, J. Roberts, C. Gillett, W. Gillett, J. Bryan, His Grace the Duke of Marlborough, H. L. Gaskell, Esq., H. Barnett, Esq., all in this neighbourhood, and who offer sheep by auction the second Wednesday in August annually at Oxford.”

There are few districts in England in which some advantage has not been derived from the cross breeding of sheep. Even the little *mountain sheep* of Wales has been greatly improved by the *Cheviot* ram, a larger, superior, but still a mountain sheep. At the same time the Cheviots themselves have been improved for the butcher by crosses with the Leicester, the Cotswold, and the Down. The progeny have been increased in size, and fattened more readily. This breed has also been considerably improved by selection.

* In the communication referred to, Mr. Druce gives a table, showing his ideas of the comparative value of the different breeds of sheep, the result of which is in favour of the cross-bred. He adds, “With ordinary skill in sheep-farming, I find no difficulty in keeping the form and size of the animal as it should be; the wool of a valuable quality, and not deficient in quantity; and I maintain that the good qualities can be better secured by employing the cross-bred animals on both sides than by confining the practice to the first cross.”

The *black-faced heath* breed, too, so well suited to mountainous districts in which heath abounds, whilst it has been supplanted in certain districts by the Cheviot, has, in other heathy localities, displaced the latter. Although very slow in reaching maturity, the mutton is much esteemed; and the lambs, from a first cross with the Leicester ram, fatten readily when removed to more favourable pasturage than the native habitat of the breed.

The testimony in favour of the advantages to be derived from the cross breeding of sheep when the purpose sought for is limited to the first cross is so strong that, however forcible may be the arguments of the advocates of pure breeding with reference to stock sheep, they sink altogether in weight when sheep for the butcher are concerned. We have noticed the advantageous custom of crossing the Dorset and Somersetshire ewes with the Down ram, thereby improving both the quality and the disposition to fatten of the lambs, whilst the early lambing and nursing qualities of the ewes are equally secured.

In Norfolk an intelligent and experienced correspondent assures us that cross breeding is of the utmost importance to the light land farmers, and that the crosses most esteemed are the South-down and the Hampshire ewes crossed with the Leicester and the Cotswold ram, by which earlier maturity is secured, together with an increase both of wool and mutton. The cross between two comparatively pure breeds is most esteemed. Most of the graziers in the locality of the writer (Mr. Coleman) speak strongly in favour of the first cross, as possessing both early maturity and a propensity to fatten. The inconvenience of the system is the necessity induced either of selling out every year, or otherwise of keeping up a pure flock, in order to afford materials for crossing. It may be observed that although generally, for the purposes of the butcher, a ram of a large breed is necessary, this is not essential when a permanent improvement is sought for: improved shape and superior quality often follow the ram of a smaller breed. Many owners of sheep, whose flocks were originally cross-bred, declaim very forcibly on the evils of crossing and the necessity of pure breeding.

We cannot do better, in concluding our paper, than gather up and arrange in a collected form the various points of our subject, which appear to be of sufficient importance to be again presented to the attention of our readers. We think, therefore, we are justified in coming to the conclusions:—

1st. That there is a direct pecuniary advantage in judicious cross breeding; that increased size, a disposition to fatten, and early maturity are thereby induced.

2nd. That whilst this may be caused for the most part by the very fact of crossing, yet it is principally due to the superior

influence of the male over the size and external appearance of the offspring; so that it is desirable, for the purposes of the butcher, that the male should be of a larger frame than the female, and should excel in those peculiarities we are desirous of reproducing. Let it be here, however, repeated as an exceptional truth, that though as a rule the male parent influences mostly the size and external form, and the female parent the constitution, general health, and vital powers, yet that the opposite result sometimes takes place.

3rd. Certain peculiarities may be imparted to a breed by a single cross. Thus, the ponies of the New Forest exhibit characteristics of blood, although it is many years since a thoroughbred horse was turned into the forest for the purpose. So, likewise, we observe in the Hampshire sheep the Roman nose and large heads which formed so strong a feature in their maternal ancestors, although successive crosses of the Southdown were employed to change the character of the breed.

It has been asserted by some observers, that when a female breeds successively from several different males, the offspring often bear a strong resemblance to the first male; which is supposed to arise from certain impressions made on the imagination or nervous system of the female. Although this is sometimes or often the case, we doubt very much whether it is so frequent as to be considered as a rule.

4th. Although in the crossing of sheep for the purpose of the butcher, it is generally advisable to use males of a larger breed, provided they possess a disposition to fatten, yet, in such cases, it is of importance that the *pelvis* of the female should be wide and capacious, so that no injury should arise in lambing, in consequence of the increased size of the heads of the lambs. The shape of the ram's head should be studied for the same reason. In crossing, however, for the purpose of establishing a new breed, the size of the male must give way to other more important considerations; although it will still be desirable to use a large female of the breed which we seek to improve. Thus the South-downs have vastly improved the larger Hampshires, and the Leicester the huge Lincolns and the Cotswolds.

5th. Although the benefits are most evident in the first cross, after which, from pairing the cross-bred animals, the defects of one breed or the other, or the incongruities of both, are perpetually breaking out, yet, unless the characteristics and conformation of the two breeds are altogether averse to each other, nature opposes no barrier to their successful admixture; so that, in the course of time, by the aid of selection and careful weeding, it is practicable to establish a new breed altogether. This, in fact, has been the history of our principal breeds. The

Leicester was notoriously a cross of various breeds in the first instance, although the sources which supplied the cross is a secret buried in the "tomb of the Capulets." The Cotswold has been crossed and improved by the Leicester; the Lincoln, and indeed all the long-woolled breed, have been similarly treated. Most of the mountain breeds have received a dash of better blood, and the short-woolled sheep have been also generally so served. The Hampshire and the present Wiltshire Downs have been extensively crossed; the friends of the Shropshire cannot deny the "soft impeachment;" and the old black-faced Norfolks have been pretty well crossed out altogether. The Dorsets and Somersets remain pure as a breed, although they are continually crossed to improve their lambs. The Southdown is perhaps one of the purest breeds we have. No one asserts that the immense improvement of this breed by Ellman was due to any crossing; whether the increased size and further improvement which it has received in other counties have been effected in all cases without a cross of any kind, may be in the minds of some a matter of doubt; yet it is only right to give the arraigned, in the absence of any proof to the contrary, the benefit of such doubt, and consider them still as pure as ever.

We confess that we cannot entirely admit either of the antagonistic doctrines held by the rival advocates of crossing and pure breeding. The public have reason to be grateful to the exertions of either party; and still more have they respectively reason to be grateful to each other. We have seen that Mr. Humphrey cheerfully acknowledges the benefit he derived from Mr. Jonas Webb's rams. Had he grudged the expense of seeking his improvements from such a renowned flock, and been satisfied with inferior rams, he would not have achieved the success which has crowned his exertions. So likewise with the new Oxfordshire breed. What matters it whether the localities occupied by these sheep were divided between their ancestral breeds or occupied as now by their cross-bred descendants: the public is benefited by having better mutton than the Cotswold alone would furnish, and more valuable wool than the Downs could supply; whilst the breeders, finding their account in their balance-sheet, have very properly perpetuated the breed which has paid so well. Our purpose has been to hold the scales fairly between both systems, having no prejudices to serve. Thus, in defending the system of crossing from some of the objections that have been urged against it, we have no wish to be thought forgetful of the merits of a pure breed; on the contrary, we would instance with pleasure the remarkable success that has attended the careful selection which, in the hands of Mr. Merson, of Brinsworthy, near North Molton, Devon, has brought out the

capabilities of the little Exmoor sheep to an amount of excellence which no inspector of the ordinary breed would have believed them capable of attaining. But whilst this instance proves how much can be done by careful selection, vigorous weeding, and pure breeding, and conveys a warning to any rash and heedless practitioner of crossing, yet, if we regard it as a bar against the system, we deprive by anticipation the spirited introducer of this great improvement of the fair reward for his labours which he has a reasonable prospect of obtaining from the proprietors and improvers of other mountain-breeds.

Although the term *mongrel* is probably correct as referring to a mixed breed, yet, as it is generally used as a term of reproach, it should not be fairly applied to those recognised breeds which, however mixed or mongrel might have been their origin, have yet by vigilance and skill become in the course of years almost as marked and vigorous and distinctive as the Anglo-Saxon race itself, whose name we are proud to bear, and whose mixed ancestry no one is anxious to deny.

Let us conclude by repeating the advice that, when equal advantages can be attained by keeping a pure breed of sheep, such pure breed should unquestionably be preferred; and that, although crossing for the purposes of the butcher may be practised with impunity, and even with advantage, yet no one should do so for the purpose of establishing a new breed, unless he has clear and well defined views of the object he seeks to accomplish, and has duly studied the principles on which it can be carried out, and is determined to bestow for the space of half a lifetime his constant and unremitting attention to the discovery and removal of defects.

Eling, Southampton.

XVII.—*Report on the Exhibition and Trial of Implements at the Warwick Meeting.* By CHARLES BARNETT, Senior Steward.

As the Report of the trials of Steam Cultivators, Ploughs, Harrows, Clod-Crushers, Rollers, and other Implements employed in the cultivation of the soil, as well as Miscellaneous Articles, is given at considerable length and with great minuteness by the Judges, it is quite unnecessary for me to make any lengthened observations on those trials. Although the place of meeting at Warwick might not claim all the advantages of the far-famed "Roodee" at Chester, yet it was a site well adapted to the requirements of an Exhibition of the Royal Agricultural Society of England that was numerically in excess of all former meetings, both in imple-