THE SIMPLE LIFE

THE POULTRYMAN

MENDELISM IN BREEDING

The rediscovery of Mendel's law has caused a revolution in plant breeding. It is not strange, therefore, that poultry breeders as well as other animal breeders should ask if it does not also offer them some help. The poultry breeder is, in fact, especially fortunate inasmuch as one of the most extensive studies in scientific animal breeding which has yet appeared is based on poultry. This is "Inheritance in Poultry," by C. B. Davenport, Station for Experimental Evolution, Carnegie Institution. There have also been extensive studies of heredity in poultry by Bateson and Hurst in England and by Erf in Kansas.

Let us consider what Mendel's Law is. We can do this best by taking one of the crosses reported on in the paper referred to above.

Black Minorcas were crossed with White-Crested Black Polish. It is well known that Polish fowls have a crest or "top-knot," while the Minorcas have none. Now, in this cross every single one of the seventy chicks hatched had a crest. Such inheritance is called alternative—that is, all the progeny resemble one parent in this one respect, while the influence of the other parent is not apparent. When some of these cross-bred birds were bred together, some of the young had crests and some had none. The proportion was not far from three crested to one without crest. This result accords with Mendel's Law. In this case the crest is said to be dominant and crestlessness recessive. A dominant character, then, is one which is found in 100 per cent. of the first generation of hybrids and 75 per cent. of the second generation. A recessive character, on the other hand, is found in none of the first generation, but in 25 per cent. of the second generation. The real meaning of this result may be more readily understood, if we follow the suggestion of Dr. Darbishire in using colored chips. Let white chips represent the germ cells (either spermatozoa or eggs) of the crested birds and red chips the germ cells of the crestless birds. Now the fertilized eggs of the Minorca-Polish cross will each contain one crest-bearing germ cell, and one non-crest bearing germ cell, which we may represent by two chips, a white and a red. Since the crest is dominant, we put the white chip on top. Or, if we choose to represent the whole result, we would have a lot of red chips covered by white ones. When one of these cross-bred chicks grows up, it will produce two kinds of eggs, or if a cock two kinds of spermatozoa, one kind carrying the crest and the other carrying the Minorca head. There are equal numbers of each kind. We can now represent the result by putting equal numbers of red and white chips in a hat. Since one egg will be fertilized by but one sperm-cell, we draw out of the hat two chips. The chances are (you can try it yourself) that one in four times you will get two red chips, and two in four that you will get a red and a white. Now this same thing happens in the fertilizing of eggs. In that fourth of the cases where the crest-producing egg was fertilized by a crest-producing spermatozoan, the chick has a crest, similarly, where the non-crest producing egg was fertilized by a non-crest-producing sperm-cell, the chick has no crest. In the other 50 per cent. the chicks have a crest, only because the crest is dominant.

D x R give DR x DR give ¼D ½DR ¼RR

Many characteristics of poultry gave results like this in the experimental crosses. In the case where the double comb of the Polish met the single comb of the Minorca, the hybrids of the first generation (DR) had Y shaped combs. In the second generation, one quarter of the progeny had single combs, one quarter double combs, and one-half with a Y shaped comb. In still other characteristics, such as shape and size, the inheritance was not alternative at all, but blended, i. e., the progeny were intermediate.

Let us now see how Mendel's Law could be used by a poultry breeder. Suppose there appears among a flock of fowls a bird having a new and desirable characteristic, which one desires to perpetuate. For instant, comblessness. It is not known whether comblessness is dominant or recessive, but by analogy we can assume it is recessive. The progeny of this bird crossed with a normal one will be all normal. If we breed these chicks together, ¼ will be combless, and when these are bred together, they will breed true. If the new characteristic, which we desired to perpetuate, is known to be dominant, such as the crest, the procedure is more difficult. Three-quarters of the second generation chicks will be crested, but only one-quarter will be pure dominants, which are capable of breeding true. The pullets must be bred to several cockerels in succession till one is found which gives all combless chicks from some of the pullets.

Mendel's Law will be used, however, far more frequently in combining two or more characteristics in one fowl. Although this complicates the work, I can perhaps make it clear in two examples. Suppose we desired to combine the silky feather of the silky fowl, which has a dark skin, with a yellow skin. By consulting the table it will be seen that silky feathers and yellow skins are both recessive. This makes their combination easy. The chicks of the first generation from the silky parent and the yellow-skinned parent will be black skinned and plain feathered. Crossing these chicks together ¼ of the progeny will be silky and ¼ will have yellow skin. The birds which show both silkiness and yellow skin will be 1-16 of the number. These birds bred together will breed true. There may be some slight impairment of color, which could only be eliminated by gradual selection. Yet this is simply because the inheritance is not absolutely alternative.

If we take the more difficult task of combining two dominant characters, the work is somewhat complicated. Let us combine the barred plumage of the Barred Plymouth Rock with the crest of the White Polish. In this case the first generation hybrids all show the desired combination of barred plumage and crest. But we have not yet the object sought, for they will not breed true as yet. If we cross together these chicks, 9-16 of the second generation will show both crest and barred plumage, but only 1-16 is capable of breeding true, that is, are DD in the terms used above. But these pure dominants can only be distinguished from those that are not pure by actual breeding. We must, therefore, take the pullets of this second generation, which show barred plumage and crest and breed them successively with the cockerels showing the same combination till we find one which will throw all barred, crested birds from the same pullets.

Poultry breeders will find in Mendel's Law an explanation of such phenomena as the cropping up of single combs in rose comb breeds, the rose combs do not appear in single comb breeds. It explains too the "strong inheritance" of booted legs and dark feet often noticed by poultrymen. The best short elementary treatise on Mendel's Law is Punnett's "Mendelism," (Macmillan). After reading this, the poultry breeder will find Davenport's "Inheritance in Poultry" (Carnegie Institution of Washington) profitable and helpful.—Roswell H. Johnson.

TYPE AND COLOR BREEDING

It has often been said with much truth, "type makes the breed, and color the variety." Supposing we paraphrase that from a specialty breeder view point and say, breeds throw types and varieties colors; unfortunately poultry judges differ on both type and color, these material foundations to all breeds; and the only means of holding or drawing judges and breeders closer together are the American Poultry association with its standard and the specialty club, the latter largely a component part of the former.

Experience of many years in breeding Plymouth Rocks, Wyandottes, Orpingtons and Rhode Island Reds, being in touch with the breeders at large shows and noting awards, gives one a pleasant field of thought to revel in, and thereby grasp a few wholesome lessons from past events.

I will endeavor to point out where the more successful arts in poultry culture reveal themselves, and the causes in some instances that waylay the amateur.

Strange to say, I am not a convert to the theory that the male is half the pen; but like most I do not believe in large matings for results. It has been my lot for some reason or other to breed better males than females; perhaps I have had better males than females to breed from. A good male will reproduce himself unquestionably providing the blood lines are right, that is, that he does not happen to be a freak bird or one brought in from another strain entirely. Freak birds we are told are often crosses of two different strains and sometimes even of breeds. However, none of the above results are my idea of the male proving himself half the pen. To prove this both sexes should be of equal merit. Given a female of exceptional quality and a well-bred male, but not of equal quality, good results can be obtained in progeny of both sexes. More good can be accomplished with a good female line and more faults introduced by the male line. I think this is well understood by old breeders as they prefer to introduce new blood through a female. A hen with a good comb has power to transmit that good quality, a rose comb hen bred to a single comb will usually throw rose combs, and with such matings a very superior comb can be produced. A hen with slight feathers on shanks will transmit this defect to her offspring in a very much larger ratio than by using a male with slight feathering on clean-legged hens. I say positively that good results can be got from clean-legged hens and slight feathering on shanks of cock bird, but a feathered legged female is indeed a disappointment. Again, if a hen has white in ear lobes she will most surely almost ruin a strain from that defect alone, but a male can readily be bred from if his mates are positively free from white in lobes. Side sprigs in a female are a most serious defect and on no account should such a female be bred from, but side sprigs on the male's comb to my mind are not a serious defect as a breeder, but should be cut off before being used in a breeding pen. These serious faults in a male bird only assert themselves as a rule, when they lose vitality, especially late in the season. Males with such faults should only be mated with a few hens and such a sire to give results must be kept in condition. Many will say why breed from a bird with a serious defect at all? Well, a breeder who knows his business will not do it, unless there is some particular quality he wants in that bird, generally type or color, depending on the breed in question. Side sprigs, in my experience, are more associated with extra fine-shaped males than otherwise; white lobes with choice color, and leg feathering with extra size. Size and quality seem hard to combine, and large-sized hens are very much the exception. Given these a breeder with skill can outstrip his competitors. I would far rather buy a hen to improve a flock than a cock, I would see that such female was very strong in breed type. Good hens can be bred to rather inferior males and give satisfactory results, but where we have an extra male bird to mate with strong-typed hens, see how much nearer we get to perfection. This is not a theory lesson, it is the results of actual practice.

There are some exceptions, I will admit. Two breeds, Games and Leghorns, will invariably stamp the progeny either way they are crossed with their shape. It is easy to raise a variety upon its legs, giving it what is called in the fancy "Style," but to shorten the thigh and shank is a very hard matter and can be done more readily through the female.

Now we will turn to the matter of color. Here we encounter a much more difficult problem, one we can not solve so readily. There seems some magic haze surrounding it, still we are making sure progress, especially along the lines of feeds. Here, again, I have found the female the strongest bird of the two. Take a buff hen. What can you expect to breed from her if she has white in wing or solid black in tail? Good wings are easily bred in females, yet in buffs and reds we have great trouble to contend with in holding sound top color with heavy laying. The most useful feed I have ever used to maintain surface color and make a heavy laying flock look presentable is linseed meal used in a dry mash, one pound to ten pounds of bran, two pounds of cornmeal, two pounds fine meat meal, two pounds fine sand. Used also in smaller proportion in feeding young stock, even the riotous red will prove attractive under such treatment. This is acceptable to red, buff and black color development but may prove dangerous to a white bird for show condition. However, a hen with a good white hackle and a purple tinge to base of new feathers across back can be generally relied upon to give white results, so also a good sound buff hen, but a black hen with purple barring is about useless to produce a flock of beetle green chicks, however good the sire.

Now we come to two rocks on which many a good bird is dashed to pieces, namely, care and feeding. What culls I have seen from the very choicest matings! The causes are lice, crowded quarters, worms and colds. They make a quartet that is hard to separate. They really arrest animal growth. By careful handling and judicious feeding, only the best results can be obtained. Especially is this true of the breeding stock and the growing chick.—A. G. Goodacre, in Poultry.

BIRDS THAT PAY

Some hens are not worth their keep; others produce enough to cover the cost of their handling. The hens that pay are those that more than meet the expense of money and time necessary to make them worth while. There are three classes of hens, and the last is the one that we all desire and the one that we can have if willing to pay the cost.

What is necessary to own birds that pay? It takes more than money to do this. You can buy birds that can pay, but it is another thing to have them pay you after you own them. Not only must you have the right kind of hen, but you must use time and thought in caring for her to make her of the "paying kind."

The paying hen is usually hatched from a paying strain. The paying hen that comes out of a flock of good-for-nothing birds is seldom met and is not worth hunting for. It takes time, it takes money, it takes born hen sense, to produce a flock of paying hens. It takes a very little neglect to send this flock back to the class of non-paying birds.

Paying birds are a delight to the eye. You like to show them to your friends, and linger in your description of what they are and what they have done for you. This class of birds—because they pay—received thought and attention from you. You gladly take good care of them; you are willing to properly mate and feed them; you look for fresh blood to improve your flock.

Paying birds never make up a large part of your flock when you sell the cream of the chicks every year. Money making flocks are made up of the best you raise, always letting the second quality go to market.

Paying birds live in houses free from vermin and supplied with pure air and water. They get feed that is needed to bring the profit to the proper point. Cheap feed—because it is cheap—never helped to produce the paying hen and kept her running to the nest. Hens that pay can be yours if you are willing to do your part.

Hens that more than pay splendid profits are what the world is asking for, is looking for, is demanding. Are you going to be among the breeders who will fill the orders for this kind of bird?

FEEDING FOR PROFIT

The right proportion of food for laying hens can be scientifically ascertained, but the relative question of the cost of different foods must also enter into the consideration. According to some authorities, fowls should receive about 60 per cent of grain, 15 per cent. of flesh, and 25 per cent. of vegetables, says an exchange. This proportion is not absolute, but relative. It serves more as a guide to the poultryman than as an infallible rule. Now the question of grain must be decided according to the locality and cost of the various grains. Where beans or peas can be obtained cheaper than grains, they take the place of the latter very acceptably, if ground and fed in an attractive form. Ground beans or peas, mixed with corn meal and bran produce very desirable results. In the wheat growing sections that cereal is the best and cheapest to feed as there is no feed better for egg-laying. Oats is a food that is not fed sufficiently to poultry. If more oats were fed, there would be lots more eggs and healthier stock. Corn, we know, has the greatest amount of fat-producing material, and oats more muscle-forming material. Beans however, exceed any of the grains in muscle forming materials, containing 38 per cent. compared to 22 per cent in oats. Lately, the writer has been feeding quite a quantity of Kaffir corn, both to the old fowls and chicks, and find it wholesome and cheap.

POULTRY NOTES

For success in the poultry business it is just as necessary for a man to hold his temper as it is for an incubator to hold its temperature.

The four signs that point to success are grit, pluck, energy and perseverance. Pluck wins. A lazy man will have lazy fowls. A good poultryman never gets the "blues."

Never eat a chicken the day it is killed. The tenderest fresh-killed chicken will be tough as soon as the animal heat has left the body. But in about twelve hours, when the muscles relax, it is fit for food.

AROUND THE FARM

SHEEP ON FARM

From the new book, "Modern Sheep; Breeds and Management," by "Shepherd Boy," we reprint the following in regard to the place of sheep on the average farm. The author of this book is the associate editor of the American Sheep Breeder, and is therefore to be regarded as something of an authority on the subject. He makes out a very good case for the increased raising of sheep, and we are very much inclined to believe that he is right. He says:

The sheep business, like every other business, has its ups and downs. At present the world is short both of wool and mutton, consequently prices are high, which is a good reason why all farmers whose farms are at all adapted to sheep farming should keep a few sheep. Prices of wool fluctuate and times have been when sheep paid but little in this country, but such state of affairs is not likely to occur again in a lifetime, since our appetite for mutton and the demand for wool is growing much faster than our flocks. The flock has always held premier position in the animal husbandry of many countries. Especially is this true of Great Britain, and the time will come when this will be true of this country.

Sheep delight in upland pasture, where dry footing prevails, no matter how poor the pasture. Nevertheless, there are but few farms, fertile or unfertile, upon which one of the many breeds will not thrive. It has been truthfully remarked that sheep will get more sustenance from poor land and do the land more good at the same time than any other class of livestock. And this is not all. In these days of scarce and high-priced labor, sheep-raising might be looked upon as a factor in offsetting this serious condition. For conserving fertility of the soil or renovating the worn out farm, nothing equals sheep.

It is a fallacy to suppose that sheep cannot be made profitable on high-priced land, since, on some of the richest farms in England, sheep are kept in large numbers, and it is a question if the rent of some of them could be paid without the help of the flock. Certainly there is no better kind of livestock on the average farm that gives so prompt and sure returns, and with so little labor as sheep; since they will live largely on the old growths of the farm. Although it is not wise to use sheep as a scavenger at certain seasons of the year, it is not advisable to treat them as an everlasting scavenger.

There are thousands of farms upon which sheep would subsist with little more than the weeds and brush with which they are overrun, and which they would convert into the best of fertilizer and distribute more evenly than any other animal on the farm, would give double returns in wool and lambs for the privilege of doing the work. Sheep manure is worth as much, pound for pound, as most of the high price artificial fertilizers.

It is claimed that seeds eaten by sheep do not germinate, which is more than can be said of seeds eaten by some other farm stock. Sheep are particularly fond of buckhorn and plantain when in seed.

In clearing up stubble fields, nothing just equals a small flock of sheep. In some instances sheep would be profitable even if they gave no return other than their work of clearing up the weeds and fertilizing the farm.

The idea of sheep killing our pasture is a fallacy, for the densest pastures in the world, are found in England, where the land is more thickly populated with sheep than any other country in the world, and, further, the idea that sheep will not thrive with other stock is untrue — where the small flock is considered, at least.

Never, perhaps, was there a more desirable time for introducing small flocks of sheep to the farm than now. Where there is one flock kept there should be ten. Contrary to general opinion, there need be no special provision made for taking care of a few head of sheep on the average farm, as they are well able to take care of themselves if they have access to shelter and water. Of course, where large flocks are considered, they must have care, and the larger the flock, the more care must be used.

THE BEEF STEER

As the season of the year is again at hand when the subject of feeding steers is in order, we purpose to deal quite extensively with this extremely vital question to Western progress.

Owing to there being more damaged grain in some sections this season than usual, we strongly advise "steer feeding" on a much more extensive plan than heretofore.

The chief essentials required to produce prime beef at a profit are:

1st, good cattle; 2nd, abundance of nutritious cheap fodder; and 3rd, general good management.

Present conditions are more favorable than the open range, for producing typical export steers. When the range was practically unlimited steers were allowed to remain there until they had attained their full growth and a fair degree of fatness, consequently they were usually sold at 4 or 5 years, according to size and condition. A marked and important change has taken place in the profitable type of beef cattle within comparatively recent years.

Formerly size and fat seemed to constitute all that was desired; now the greatest attention is paid to quality in all leading markets, young finished animals not exceeding 3 years being in demand. In the past there has been too little discrimination paid to quality by buyers in the west, thus placing a premium upon size, even if coarse. However, we have good reason to believe that day is near its close.

How quality counts on the British market is shown by the following quotation from an address delivered by John McMillan, M. P.

He says: "I was standing on the cattle market in Glasgow one morning and saw six steers sold, they would average 1,325 lbs., all grades, and a trifle rough. The highest price was £16 10s. The next animal sold was a well built, round-ribbed, smooth, compact, little beast weighing 1,250 lbs. He was sold for £18 10s. Here was £2 (or practically $10.00) more money for an animal 75 lbs. lighter in weight. Quality has another advantage fully understood by feeders, namely, that animals of good quality possess in a marked degree the ability to utilize their food to better advantage; that is, although they may not increase in weight more rapidly than ordinary steers, yet the increase is put on the higher priced portions, consequently the animal commands a better price per pound.

At the Illinois Experiment station 69 steers were graded according to quality, and as a test fed for six months, a record being kept of all cost. The following is a list of profits according to grading:

Fancy gave a profit each of	$18.15
Choice " " "	15.67
Good " " "	4.09

This shows how quality counts when records are kept.

Steers from 2 1-2 to 3 years old, weighing from 1,250 lbs. up, command the highest price for export trade at centres where export conditions are studied, provided they are of desirable conformation and finished.

Beef Characteristics Briefly Defined

A general beef form means that the animal must be low-set, broad, deep, smooth and even, with parallel lines, says the Farm and Ranch Review. In all lines of business the producer must cater to the consumer if he would succeed, and here, it is perfectly understood that trade requirements call for a thick, even covering of meat of prime quality in the regions of the high-priced cuts, which roughly speaking means the upper half of the body from behind the shoulders backwards, and as a natural result if the the animal does not come up to this standard his value is lowered in proportion as he departs from it. This proves to us the necessity for a broad, straight, smooth, even back, deeply fleshed, a thick broad loin, ribs long, arched and well covered, a full, deep, wide chest, large girth, full crops and long, deep, wide hindquarters. There should be no "tucked up" appearance just behind the foreleg, for this indicates a lack of constitution. A full flank, even with underline is also very desirable, and any animal seriously cut up there is deficient in depth from loin to flank, which is very objectionable. Broad buttocks and a full twist, well let down, are also important.

Quality, as before intimated, is desirable, and this is best told by handling, although a trained eye is seldom deceived. The flesh on the high-priced portions should feel firm, yet mellow, and be very uniform, alike free from hard rolls or lumpy patches. A coarse, bony, slab-sided animal, bare of flesh on ribs and back, with dairy thighs, a harsh hide and wiry coat, is about the most undesirable type imaginable. That a mellow, elastic hide indicates a good doer is well known to all stockmen, and the reason is that the sections of the skin are in perfect order, and from this we can justly conclude that the inner skin, the lining of the stomach, etc., is also in the best condition; thus the animal is able to assimilate the full nourishment which his food contains, consequently gains rapidly and has that thrifty, sleek appearance we all admire.

The beef steer should show strong breed character, that is, be a good grade of one of the beef breeds. He should be active and vigorous, which denotes good rustling ability, but not restless, as a fidgety disposition is not conducive to heavy fleshing, insomuch that it does not indicate that desirable, contented temperament which stockmen prize. Combine aptitude to put on flesh rapidly with an early maturing predisposition, and the vital question of the beef producer as regards type, is solved. This phase of the matter is of greater importance under present conditions than when the open range provided all needed food; then it mattered little whether extra feed was required to produce beef; now it is desirable to practise economy by husbanding your resources in every possible manner, and one of the best and surest ways is to use animals of the type which it has been proven give most gains for food consumed.

How to Produce This Type of Animal

This is an important question, and one that has been taxing the skill of our best breeders for many years. The typical beef steer of today was evolved from the rougher, mixed-bred cattle of ages ago through the persistent, intelligent, systematic efforts of generations of far-seeing stockmen, and we maintain that by careful mating, always using the best pedigreed bulls of individual merit and early maturing strains which you can afford, that your herd will rapidly improve. Such sires impart to their offspring early maturing qualities, and these stand out prominently, above all other sources, as the means of producing juicy, marbled meat, the kind consumers crave and only top-notchers produce. By using, then, the best bulls, combined with judicious, liberal feeding, results will compensate you for the outlay and toil. Many claim it is impossible when purchasing bulls to distinguish the early maturers from others, but we think this idea is largely erroneous. The low-set, blocky type are generally early maturers; then again, bulls are usually purchased before they are full grown, and the pedigree will show their age, so you can tell by size and general appearance if they are rapid developers. Unless they are naturally thick and growthy, showing that they are well advanced for their age, have nothing to do with them. When purchasing bulls, remember you are purchasing them as transmitters of beef qualities, and this will guide you while making selections. Constitution is all important, the vital organs must be strong, and masculinity prominent, for without these they cannot be impressive sires.

Broad, deep bodies, naturally well-coated with flesh, are essential, and long, well-sprung ribs give this formation; these points along with long, deep hindquarters, dare not be overlooked. They must also be good handlers, and should be possessed of an abundant coat of long, fine hair. You can afford to overlook a rather conspicuous tail head, an unsightly horn, etc., yet, of course, other things being equal have these minor points as nearly perfect as possible, but never forget that utility in a sire is all essential, and under no circumstance sacrifice it simply because in some trifling detail he does not reach your standard.

Always remember that the sire is at least half of the herd, then you will more likely realize the enormous advantage of having that half, which is embodied in one animal, of the highest possible standard. When the breeding of sire and dam for several generations back are alike uniform on both sides of the genealogical tree, the dam's influence on the offspring is very marked, although not to the same extent as the sire's, but where either one is of mixed breeding, and most cows which produce beef steers are, how extremely important it is that the sire should be, not only a splendid specimen of a beef bull, but that his progenitors should also be of an equally high standard, similar in type, and that the mating in each case for at least the last four crosses back would niche well, then when a bull bred in that manner is mated with cows of mixed breeding, his influence is immensely more impressive than the dam's, consequently his prepotency will stamp itself in the offspring to, at least, a three-quarter extent. Individual excellence in a bull is extremely important, yet without good ancestry back of it we have no reasonable assurance that the sire's superior qualities will be handed down as a universal heritage to his numerous progeny. This is where well-matured pedigreed animals have the advantage, and a great advantage it is. Breeding is merely handling over the merits or demerits of the ancestors.

If your females are a poor class of grades to begin with, and you feel you cannot afford better, yearly cull out a few of the worst, and on no consideration sell cows that produce fairly early maturers; also be slow to part with any of their female progeny.

Abundance of Nutritious Cheap Food

Fodder, both appetizing and nutritious, can be grown in abundance in the west, and right here is one spot where a deviation from common practice would be found profitable. The chief fodder used is hay, cut and saved whenever convenient, without any thought as regards nourishment or palatableness. Without nourishment, gains cannot be made, and, unless the food is well saved, animals will not consume it readily, and it is well known that a large portion of the food consumed is required to maintain animal heat and build up waste tissue. Only what the animal eats in excess of these requirements can be converted into increase of weight. Now if the food is not palatable the animal will not likely eat any more than the needs of the body demands, consequently he is boarding at your expense, whereas you should be receiving profit.

Maintenance Ration

Conditions should be studied to lessen as far as practicable the amount of food which the animal requires for bodily support; this we call "maintenance ration."

Under favorable conditions 80 per cent. of maintenance ration is required to keep up the heat of the body, and the 20 per cent. for building up waste tissue. Thus we can understand how necessary it is that our cattle should be sheltered during winter storms, for if they are not they simply take what would have been profit and utilize it to assist them in withstanding severe climatic conditions.

Necessary Shelter

Formerly, with the open range, stock could find shelter either in scrub or coulees; now fences frequently debar such protection, and as a more intensive line of farming is beginning to prevail, it stands to reason that better shelter must be provided. Good sheds built in some sheltered spot, open on the least exposed side, with trees planted some little distance from them on every side for additional protection, would prove of great advantage. Suitable tree seedlings can be had through the Forestry Department, Ottawa, without cost, to those who properly prepare the soil for them.

Varied Diet

The value of an article is largely determined by the cost of production, and it has been proven that better health and greater gains accompany a varied diet when feeding cattle.

The cultivated grasses — bromus, timothy, and western rye grass—should be more universally grown; they have been tested and the results are highly satisfactory. Alfalfa, red and alsike clovers should also receive more attention than they are getting. These clovers are giving fair results in some districts, quite sufficient to warrant a more universal seeding, for it is well known they make excellent pasture and good hay. Alfalfa should be cut for hay when one-quarter of the plants are in bloom; if left longer it becomes woody. Without soil inoculation it appears to grow fairly well in several localities where it has been tried in the west; where the soil has been inoculated much better results have been obtained. Begin by sowing on a small scale. Alsike in numerous sections of the west is also doing well, and although not nearly so rank a grower as alfalfa, nor as well adapted for pasture, owing to its light aftermath, it makes first-class hay. Red clover is also giving good returns in many localities.

In addition to cultivated grasses and clovers, oat and wheat sheaves make excellent winter fodder; they are grown at present quite extensively for that purpose. We would advise growing peas with the oats, for the reason that peas are considered the best grain for finishing beef cattle. Cattle, fed on a part pea meal ration, will handle firmer and stand shipping better than those fed on other grains; yet we do not recommend this process for the west at present, but simply sowing oats and peas mixed, about half and half, and cutting green for fodder. If sown in that proportion there will be considerably more oat than pea plants, owing to the difference in the size of kernels. The crop can be harvested with the binder if desired. Peas do well throughout the west, so this is not an experiment, although we do not know of peas and oats being grown together for the purpose mentioned.

Every beef cattle man should have a good patch of rape where he can turn his cattle, young things, cows and all, to graze when his common pasture becomes scarce. It is advisable to have a piece of pasture in conjunction with the rape where the stock can get a certain amount of dried food, or else it is likely to scour them severely at first. If a pasture of this kind is not available, hay or straw will answer the same purpose, and, if not any of these substitutes are convenient, it will be found well to only allow the stock short periods on the rape until their digestive organs have become accustomed to the change of food.

Dwarf Essex is the variety to use, and it can be sown either broadcast or in drills. If the land is reasonably free from weeds, sow broadcast, about 3 lbs. of seed per acre. If the land is dirty, or you fear extremely dry weather, sow in drills, using about 3 1-2 lbs. of seed to the acre. The handiest way if you intend sowing in rows is to take your seed drill and securely plug two-thirds of the spouts. This in most cases will leave the rows about 21 inches apart, but anything from 18 to 24 in. is considered suitable. For July or early August feeding it should be sown in May; if for later feeding, sow in June. A good plan would be to sow at intervals two weeks apart, perhaps three sowings. Rape is also suitable for late fall and early winter feeding.

There is always quite a percentage of inferior grains that it is well to feed on the farm; in fact, as a rule it pays best to feed all coarse or secondary grades of grain, selling only the grain, that which commands seed prices, and wheat for flour. This inferior grain should be fed as chop to calves and export steers.

There is no doubt but that the first twelve months of the animal's life is the most important period, and the old adage applies here with peculiar force: "Well begun is half done." It has been demonstrated time and again, at numerous experiment stations, that at no period in an animal's life can such cheap gains be made as during the first year. The younger the animal the greater its ability to digest in proportion to its live weight. The approximate rates from numbers of experiments show that as 3, 7 and 12 stand in relation to each other, so is the cost of gain in cattle, first, second and third year.

The point is, keep the young things growing, and, as previously stated, it is only what they digest in addition to their maintenance ration that can be used for increase of weight.

What flesh an animal loses in winter, whether through cold or scarcity of food, must be built up a second time (by food), and that is a direct loss to the producer, for he has twice to manufacture, if you will permit the term, that for which he will only be paid once. Judicious feeding, with fair shelter, and good sires, can save one year from the average time required to fit for export under former range conditions. That means a great saving of feed, also much less capital involved, through saving of holding over an extra year, and in addition it is catering for export trade, which was never previously done.

Top-notchers are always in demand at the leading markets at fair returns for labor and outlay.

FEEDING YOUNG PIGS

Although pigs possess the ability to digest a comparatively large proportion of the feed given them, it cannot be expected that young pigs, recently weaned, should deal effectively with materials that would tax the digestive powers of an old hog. Indigestion, so common in the biped, and by no means infrequent in horses and cattle, is rarely met with in pigs unless the feeding is very bad. Their stomach takes kindly to the most mixed and varied diet, but frequent feeding is indicated, as the stomach is a small one, and this is especially the case with young pigs. The amount of food to be supplied cannot be measured in ounces, but it should be as much as they can consume without toying with it, or leaving any in the trough. The feeding troughs should be kept clean. Food left in the troughs is not only a waste, but tends to increase the too commonly filthy surrounding of the piggery, which are by no means essential to fattening.

When digging dandelion, plantain and other noxious weeds from the lawn, provide yourself with an empty baking powder can or similar utensil, perforate cover "pepper-box fashion," fill with best grass seed and shake over the spot from which weeds have been removed, thus putting the grass seed directly where needed and saving the waste that would occur under any other method.—M. S. Bilsh.

On the average about 23 1-2 lbs. of milk is required to make one pound of butter. On this point, however, great variation will be found.