

blades of grass to grow where only one grew before. From what I can learn, clover seeds were first sown about the beginning of the seventeenth century, and about 1650 they were sown almost as they are now. It may seem strange, but for nearly two and a half centuries little improvement on the old system of sowing our seeds has been made; while, on the other hand, we know that the grass on many farms is not so good as it used to be. None of my hearers doubt the importance of having good pasture, but were I to ask how much rye-grass and clover seed I should sow per acre to make good grass, so much diversity of opinion exists that ten farmers from the hundred now present would not advise me to sow the same quantities. Without respect to the kind of soil, one farmer sows 40 lbs. of light rye-grass and 4 lbs. clover seeds per acre, while his next-door neighbor, in the same sort of soil, will sow 30 lbs. of the heaviest rye-grass, and 10 lbs. of clover seed per acre. Now, one of the two must be wrong. Unless soil, and crop, and climate are considered, we shall never make good pastures, or hay, for there is a certain "understood connection between the soil and the kind of plant," and it is therefore quite out of the question to suppose that the same seeds will suit all soils and all climates, will suit our thin, high-lying fields as well as our in-town, whether intended for hay or pasture. In too many cases farmers, when selecting their seeds, do not consider that the field for hay should get different kinds and quantities of seed from the field that is to be pastured, and the consequence is that disappointments often occur. Without referring to any particular soils, but speaking generally of the soil in our vale, farmers should sow for hay a large percentage of English red and alsyke clover, with a few extra lbs. of rye-grass. For pasture, more white clover, with a good deal of cow-grass, and a few pounds of Italian rye, and in high-lying soils a pound or two of trefoil (per acre) is very useful, especially for sheep pasture. I strongly recommend the cow-grass clover, not only because it lives a year longer than other clovers, but it has a much larger root. The Italian rye-grass is also of great moment to the farmer, being a most useful early grass, and, if sown at the rate of 6 lbs per acre in the field intended for hay, the second crop will greatly abound with it, thereby being a preventive for the blowing of cattle. By sowing a few pounds of it with the other seeds, you may then sow less clover seed, and be easier on your soil. Some farmers do not sow alsyke clover. I think this is a mistake. It is a most useful friend to the farmer. It is perennial, no winter kills it, and it is very seldom injured when the crop is laid. It is said cattle do not eat it, and, no doubt—it being a strong-tasted plant—they do not care for too much of it. Were I to compare the taste of the cattleman to the cattle, the matter may be explained by telling you that one of our north country cattlemen went lately the round of Bingley Hall, Smithfield, and Newcastle shows, and on being asked by his companion, when he returned home, "Fa he liket to live in the south?" he replied, "Nae ava, Saundy, man I liket the diet a' y' weel in the b'ginning", but as I got naething ava bit roast beef and plum puddin', and stuff o' that kin', I got rael sick saer't o't." Now, cattle are somewhat like our cattleman—they do not like too much of any good thing—they do not care for too much alsyke, and to justify what I say, you have only to notice them, when in a field of the finest clover, go and eat the moss from the top of the fence. Very often the farmer is surprised to find abundance of clover in one field, and hardly a plant in the next. My belief is that this is in a great measure owing to the kind of seeds we sow. A deal of the foreign clover seeds are too weak to withstand the vicissitudes of our changeable climate. Frost one day, rain the next, sleet and rain and snow, and so on, on certain soils, has a tendency to throw out the clover seeds. I have seen a field where, on the part that was exposed, hardly a plant could be got, while on the other side of the field, which got the same amount of frost, but did not get the morning sun, plenty of clover plants were to be seen. The farmer should therefore use as hardy seeds as possible, and this can only be obtained by using seeds of certain countries' growth. I mean English grown seeds, or at least a large percentage of them. Welsh red clover is also becoming a favorite. You all know the importance of a change of oats, and, in like manner, red clover from the mountainous districts of Wales is a capital change. If the farmer sow English grown clover, he may expect a strong, broad-leaved plant. If, however, he sow weakly seeds, unless in very favorable seasons, he is certain to get weakly plants. Let him sow strong clovers, or, at least, a large percentage of them, and then he will hear less of that remark, "clover sick," which many of our best farmers only too often make. Owing to the size of our clover seeds, there being from 240,000 to 250,000 seeds in a pound,

the farmer often makes the mistake of burying his seed. By experiment we lately found that red clover brairds best with a covering of half an inch of soil, that only fifty per cent. will grow if put 1½ inches deep, and at a depth of two inches not a plant will appear. With white clover the best braird is with half an inch of covering; at 2 inches only the half will grow, and at a depth of 1½ inches not a seed will germinate. From this the necessity will be seen of getting a fine mould to receive the seeds, and also, on looking at the root of clover I showed you, you will then see that too much care cannot be taken in preparing the soil, the rootlets being so very feeble. Some farmers roll the soil before putting in the seeds, but in many cases, if rolled ten times instead of once, all the labor would be repaid by the crop, for it is evident that if the smaller clover seeds be sown on a rough, cloddy surface, the half will never spring. Good pasture is not only valuable in itself, but through all the rotation, and the loss, therefore, to the farmer when his seeds do not grow, is not only on his hay or pasture, but also on his succeeding crops. Even as far back as 1700 it was noticed, "that where there was a good crop of grass, a good crop of grain generally followed." We know that the roots and leaves of our clover grow in direct proportion to each other. The farmer should therefore use every effort to get strong plants, and plenty of them. When laying down the grass and clover seeds last season, I set aside three plots, giving to No. 1 plot 5 lbs. of clover and 36 lbs. of rye-grass seed per acre; to No. 2 plot I gave 6 lbs. of clover and 36 lbs. rye-grass seed per acre; to No. 3 plot I gave 7 lbs. of clover seed, 30 lbs. of rye-grass, and 6 lbs. of Italian rye—the clover in plot 3 being the best, strong, healthy seed I could lay my hands on. I last week dug up one square yard from each plot, sifted out all the roots of clover and rye-grass, and weighed them. In No. 1 plot I had 24 cwt. of roots per acre, in No. 2 plot I had 29 cwt. per acre, and in No. 3 plot I had 35 cwt. of roots per acre. Can any one doubt the importance of strong seeds after this? With roots something like what I have already showed you, the value of which as a manure many here will be able to enlarge upon, roots entering the very subsoil, decaying and opening up the soil, making way, and acting like drains. This opening of the soil is a most important matter to the farmer, and no landlord knows it better than our chairman, when I am told he gave a tenant of a 150-acre farm £90 in on year for drainage. We got a very able paper last year from Mr. Stevenson on the manure we should give to our grass, and I need not touch this wide subject. But how is it that bones and lime often improve our pastures? The science of chemistry tells us that an average crop of clover carries away per acre about 80 lb. of lime and 19 lb. phosphoric acid. The necessity, therefore, of returning lime and phosphoric acid in some shape may easily be seen. White clover is an acid-hating plant (chemistry comes again to our rescue, and tells us that time will take away the acidity from the soil, and allow the white clover to be in the condition of my friend the cattleman—get the food it likes. I do not believe the ideas on future farming lately seen in *Fraser's Magazine*, where it is proposed to raise three crops in the year by heating the soil with steam, nor do I believe that Mr. Jeffries' ideas of cultivating our fields will work. I would rather put the steam into the brain of our rising generation, by teaching them chemistry. Let them take a leaf from the life of the owner of Tiptree Hall (whose works are well worth reading), and who writes me that his success has been by giving plants their proper food—by attending to his subsoil. Is it not a blot on Scotland, and more so on Aberdeenshire, the most famed cattle-feeding county in Britain,—that we have no middle-class school or college where the rising generation might study the science they are to follow after, for surely the science of agriculture has now a claim deserving of attention? Until this come about—until the groundwork of the problem be understood—the words of Liebig will come only too true—unconsciously to the ignorant farmer, all his industry, care and toil only hastens his ruin; while, on the other hand, it is only by knowledge that capital and power are attained.

Mr. McCombie, M.P., said he occupied some very poor land, and he did not know of any other clover that would grow on it as alsyke did. He did not say that cattle were particularly fond of it, but he found that alsyke clover afforded them a fresh mouthful where no other clover would hold, and he thought that on many farms it might advantageously be sown, if not alone, mixed with other clovers.

Mr. Mitchell, Auchnagathie, had got a great deal of information from Mr. Bruce's paper, but he should have liked if the essayist had given them some idea of the quantity of grass seed that should be sown. On the plots which Mr. Bruce had mentioned, the weight of roots seemed almost incredible. He thought

Mr. Bruce had also neglected to say what was the weight per acre of the grass grown on each plot. Did it correspond at all, or was the lighter weight of roots the heavier crop of grass? Ho (Mr. Mitchell) thought it was likely that it was so, or, at least, that the medium quantity would have been the heaviest crop of grass.

Mr. Anderson, Wellhouse, thought alsyke clover should be more extensively used than it had yet been in that part of the country.

Mr. Bruce said soils differed in composition so much that he would scarcely take it on him to say particularly what quantity should be used. The nature of the soil on each farm had to be considered, and the quantities would vary. He had only given his own experience. With regard to the grass grown, much of it had been destroyed by sheep, and he could not give the quantity. The roots were weighed when they were taken up.

A vote of thanks was passed to Mr. Bruce for his paper.—*North British Agriculturist*.

SOWED CORN.—Do not fail to sow this crop in succession either for soiling purposes as the pastures get short, or for curing for winter. By all means sow in drills, that the cultivator may pass through the rows, and that the sun and air may have free access to ripen and elaborate the juices of the plant.—*Maryland Farmer*.

TOP-DRESSING MEADOWS.—D. G. is informed that we had quite as soon top-dress a meadow early in spring, just as the grass is starting, as at any time of year, indeed, we had rather, with a view to securing the full benefit of the manure, apply it at the time named than in the fall. But the question of time and labor is involved; and the farmer, as a rule, has less time to do this work in than in autumn.—*Ex.*

MILLET AND HUNGARIAN GRASS.—Wherever the prospect is for a short hay crop, prepare and sow a few acres, or a single one, in one of these valuable forage crops. They will be fit for use just at a time when most needed, and what is not consumed green is easily cured. They make excellent food cut green for soiling, much liked by cows. They should both be cut when in blossom, as if the seed is allowed to mature, the hay is then of little value.—*Maryland Farmer*.

TREATMENT OF RED CLOVER.—A correspondent of the *Rural New-Yorker* writes: "When red clover ceases to do well, it is generally the consequence of lack of lime or lime stuff in the soil. Lately experiments have proved with a satisfactory result that there is a remedy for this, in a method of artificially supplying the soil with the required necessary lime. When the soil prevails to red clover, root crops, such as potatoes, sweet potatoes, beets, turnips &c., are planted, that require hoeing, apply the lime to the soil, mix it well with the same, (before hoeing) and the result has proved exceedingly satisfactory."

PERMANENT GRASS.—Water meadows are amongst the most productive of permanent grass lands. But the management of water meadows is very frequently injudicious. No cattle should be allowed upon an irrigated meadow, nor should the water be permitted to run continually over one spot. A meadow thus treated very soon becomes a morass, and is then spoiled. A dressing of bone-dust is remarkably beneficial to water meadows, greatly thickening the grass and improving the quality of the hay. An application of plaster the next year still further improves the meadow. As soon as the hay becomes inferior in quality and decreases in quantity, it is restored by a repetition of this treatment. The opportunities for making water meadows are frequent, and as their value becomes appreciated they will become much more common than they are now.—*Am. Agriculturist*.

MIXED GRASS.—At the annual meeting of the Mass. Agricultural Association, a paper was read upon growing grass. In the discussion which followed it was remarked that farmers should be careful to sow together only those grasses which ripen at the same time. This is a mistaken idea. The chief reason why a variety of grasses should be grown is that there may be a constant succession of growth. The weakest point of our meadows is that the grass ripens, fades, and suspends growth for the season, leaving a brown, withered, or bare surface. If there were a succession of consecutively ripening grasses there would be a continued greenness and verdure, and the pastures were only not overstocked, this would be as great an approach as we can make with our peculiar climate towards a permanently green meadow or pasture. But if all the grasses ripen at once, we may as well continue to grow one single good grass as several good and bad ones.—*Am. Agriculturist*.