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of the herbaceous sort, which rises to a considerable height with a thick strong stem, especially where the ground is favourable to its growth. It affords a rind or coat, the texture of which is firm and strong, being held in high estimation in the manufacture of the more coarse sorts of cloth, ropes, and different descriptions of cordage, as well as a number of other articles.

There is a great variety of other plants, both of our own growth and that of other countries, which yield a strong fibrous covering, but none that have yet been discovered, which are in any degree equal to this in the forming of the several articles that have been just noticed. It is, of course, a matter of much regret, that the growth of a plant of such utility and importance should not be more attended to in this country, where there is so much land well suited to its cultivation.

Soil.—The nature of the soil most adapted to the raising of hemp crops, is chiefly that of the more deep black putrid vegetable texture, which has a somewhat low situation, with some degree of inclination to moisture. But they succeed tolerably on the deep mellow, loamy, and sandy descriptions. The great difference is, that on the former sort there is generally a more abundant produce; but which some suppose of a less valuable quality. They are also capable of being grown on soils of an inferior quality, where proper care and attention are bestowed in their culture.

In entering upon the cultivation of this sort of crop, it is necessary for the farmer to have regard to several different matters; such, for instance, as the convenience of markets for the disposal of the produce; the capability of providing sufficient supplies of suitable manure; the diminution it will cause in the extent of necessary green crops for the use of live stock; and its being of a nature to contribute little to the increase of the dung-heap; as well as to the great trouble and attention which it requires in being prepared for the market, &c.

Preparation.—It is necessary, in preparing land for this kind of crop, that it should be brought into a fine mellow condition, and be perfectly freed from all sorts of weeds, by the frequent operation of the plough and harrow. These are usually accomplished where it is put in after grain crops, by having recourse to three ploughings and an equal number of harrowings; the first being performed as soon as possible after the preceding crop is removed, the second as early as it can be done in the spring; and the last, immediately before the seed is sown. Some, however, give four ploughings, and as many operations of the harrow; or two ploughings, with a sufficient number of scuffings, having the surface ultimately harrowed down quite fine, and left in broad flat ridges.

It is usual in the ploughing, immediately before the seed is put in, to apply well rotted farm-yard dung in the quantity of twenty-one-horse cart loads, or good rich compost in the proportion of thirty-three, as without such dressings good crops can seldom be procured.

In the growth of this kind of crop in Scotland, they manure the land well with the best dung; and after the seed is put in, top-dress with ashes, and the dung of sheep, pigeons, &c.

Seed.—It is of much importance, in the culture of this sort of crop, to have such seed as is perfectly fresh and good, which is best ascertained by its weight and the brightness of its colour.

The quantity of seed must necessarily vary under different circumstances; but from two to three bushels are the quantities most usually employed. Too much seed should, however, never be given, as much injury is constantly done where the plants are too close and thick upon the ground. Where the sowing

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fowing is executed in the drill manner, a much smaller quantity of seed may be sufficient.

Sowing.—This is, in the greatest number of cases, performed in the broadcast manner, being dispersed over the surface of the prepared ground as evenly as possible, and then covered in by means of light harrowing.

Where drilling is had recourse to, which is supposed to have the advantage of more completely promoting the early growth of the plants, especially where seed is the object, the rows should be formed as near together as the shares of the machine will admit.

The proper time of sowing this kind of crop, is when the danger of the spring frosts is over, as when put into the soil too early, it may be greatly injured by them, and when kept out to a late period, it may be much damaged in that way. The best season on the drier sorts of land is, without doubt, as soon as possible after the frosts in the month of April, while in those of a more moist quality, it is the most safe way to delay it to a later period, always choosing a medium state of dryness in the mould of the soil for the execution of the business. The seed should, however, never be kept out of the soil a moment when the season is suitable, as various advantages attend the early sowing of this crop, such as the superior vigour of its early growth, and its withstanding the different after operations practised upon it in a better and more effectual manner. It is, however, to be remembered, that the plant is of a rather tender nature.

This is a kind of crop that is capable of being grown after most other sorts, and even on land broken up from the state of sward, in a perfect manner by the use of the skim-coulter plough. And it has been grown on the same spot of ground for a great number of years, without the intervention of any other sort. In Suffolk this has been the case for seventy years in succession, but with the almost constant use of manure to prevent the exhaustion it would otherwise produce. And in other districts the same is the case.

It is constantly necessary, when the seed of the hemp plant has been sown, to use much caution in keeping the birds from the ground, as they otherwise devour a large proportion of it in a very short time.

After-Culture.—But little attention is necessary in the management of this crop after the seed has been deposited in the ground, the tall growth and thick shade of the plants, from the nature of their foliage, soon covering the surface, so as to prevent the rising of every sort of field weed.

In cases where the drill machine is employed in putting in crops of this nature, it is sometimes the practice to give them a hoeing or two in their more early growth.

It is necessary to observe farther, that in the culture of this sort of field-crop, there should be a mixture of the male and female, or *female* hemp plants, in order to the obtaining the most complete success. The latter is the sort that yields the seed, the former affording merely flowers.

Pulling.—When the crop is become perfectly ripe, which is known by its putting on a whitish yellow colour, and the stems beginning to shed their leaves, it is time to pull it; but the male sort of hemp frequently becomes ripe some weeks before that of the female.

They are in general both less injured by being pulled at too early a period than too late, or when they are not too fully ripened. And at the time one part is pulled, it is necessary to be cautious that as little damage as possible be done to the other. When the land is in narrow ridges or in drills, there will be little danger of its being injured as

the side-furrows or intervals will give sufficient room to those who are engaged in the work of pulling.

In some districts both kinds of the hemp plants are pulled together, while in others they are separated, and the latter is supposed the best practice where it can be adopted, as by pulling a large portion of the crop before it is properly ripened, the amount of the produce must not only be considerably diminished, but its quality be much impaired in respect to its durability.

The work of pulling is performed by forcing it up by the roots from the ground in small portions at a time, by means of the hand, shaking off the mould well from them before the parcels are deposited upon the surface. The business is commonly executed in a little more than three months from the time of putting in the crop. The expence of the work varies greatly in different situations and circumstances.

In some it formerly amounted to the large sum of 18s. or 20s. the acre; while in others it is performed in an equally good manner for not more than 11 or 12s. But at present the expence of the labour stands considerably higher.

As soon as the labour of pulling is finished, the hemp is tied up into small bundles, or what are commonly denominated *bais*.

Seeding.—Where crops of this nature are designed for the purpose of affording seed, they must of necessity stand until the seed becomes perfectly ripened, which is readily shewn by the appearance of the plants. The stems are then pulled up and bound into rather large bundles; which are set up in nearly the same way as those of green, until the seed becomes so firm and dry as to shed in a free manner: it is then either immediately threshed out on large cloths for the purpose, spread out upon the field, or preserved in small stacks, to be afterwards performed at the farmer's convenience. In the business of pulling, much care is required to prevent the seed from being lost. The seed of the hemp may be rendered much more fine, hard, and slippery by suffering it to stand out in the stooks in the field for some days when the weather is fine, and, in order to prevent any inconvenience in the watering of the stem parts, the seed-pods may be chopped off with a knife for the purpose, and be afterwards dried upon some sort of cloth, being fully exposed to the influence of the air in some sort of shed or other similar place. By this means the danger of injuring the hemp by threshing out the seed, as well as by sun-burning, rain, and the loss of the colour, may in a great measure be avoided.

Preparation of the Hemp.—In rendering the rind or bark of the hemp-plant proper for the uses of the manufacturer, it is necessary for it to undergo a variety of other processes.

Retting.—This is performed in two different methods, either by means of the dew or the use of water. The former is denominated *dew-retting*, the latter *water-retting*, which affords much the finest hemp. Both these processes are said to answer the most perfectly when the weather is inclined to be showery while they are going on. In the dew-retting method, the hemp-stalks are, immediately after being pulled, spread out in a thin, even, and regular way, so as to keep exact rows on a fine piece of close, old, sward land, which is pretty even on the surface, for the space of three, six, or even eight weeks, according to circumstances, being turned as often as may be necessary in the time. In showery seasons, this is mostly done three times in the week, while in other circumstances, twice is in general as much as is requisite.

As soon as the rind or barky portion of the hemp-plant becomes easily separable from the firm part of the stem or

bundle, it is taken up from the ground, and tied up into rather large bundles, in order to be carried home and stacked up, or placed in some covered building till it is wanted for being formed into hemp.

This process is denominated *graffing*, and in its execution requires great nicety and attention, in order to prevent the texture of the hemp from being deteriorated by too long a continuance on the sward, or by removing it at too early a period before the hemp substance has been rendered sufficiently separable.

In the water-retting method, which is much more common and speedy, the hemp, after being wholly taken up, and bound into rather small bundles, by means of bands at each end, is carried in general to a pond of standing water; such pits as have clayey bottoms being mostly preferred, being there deposited bundle upon bundle, in a direct and crossing manner, so as to form what is generally called a *bed* of hemp. When it has been piled to such a thickness as the depth of the water will admit, which some suppose can hardly be of too great a depth, though five or six feet are the most usual depths, the whole mass is loaded with large pieces of heavy wood, until it is completely immersed. When it has remained in this state for five or six days or more, according to the nature of the pond and the weather, it is taken out and conveyed to a piece of mown grass, or other sward-land, that is perfectly clean and free from all sorts of animals. There the bundles are untied, and the hemp-stalks are spread out thin, stem by stem. While in this state, especially in moist weather, it must be carefully turned every second day, to prevent being injured by the worm casts. It is continued in this way for five or six weeks or more, when it is gathered up, tied in large bundles, and kept perfectly dry in a house or small stack, till wanted for use.

In some of the northern parts of Scotland, where, after the hemp is pulled, and the leaves, seeds, and branches removed by means of a ripple, it is formed into bundles of twelve handfuls each, and steeped six days or more in the manner of flax. It is known when it has had sufficient watering by the reed being readily capable of parting from the bark. But it is favourable that it should rather have too much than too little time. The most slender hemp stands in need of the greatest length of time in the water. Where the quantity of hemp is only small, the hempy part may be separated from the reed by hand labour; but where it is large, drying and breaking it in the manner of flax is the best method. See *FLAX*.

The hemp, after being taken out of the water, is not here spread out upon grass-ground in the way of flax, but dried as quickly as possible, by setting it in an inclining position, against cords fastened up for the purpose, or in any other way that will afford it the full benefit of the air, until it is completely dry, and rises in blisters from the boon. As soon as it has been reeded, it should be cleared from the mucilaginous material which it contains, by pouring water upon it and repeatedly squeezing it, being careful not to let the fibres be entangled together, as by that means waste is incurred.

Mons. Brealle on the continent, has however suggested a very different method to any of these, for the purpose of steeping hemp, the advantages of which, it is asserted, have been fully proved by numerous trials. The process consists in heating water in a vessel or vat to the temperature of from 72 to 75 degrees of Reaumur, dissolving in it a quantity of green soap, in the proportion of 1 to 48 of the hemp. The body of water made use of in this intention, should be about forty times the weight of the hemp. When this is prepared,

the hemp should be thrown into it, in a manner so as to float upon the surface, the vessel being immediately covered, and the fire put out. The hemp should continue in this state for about two hours, when it will be found to be fully steeped.

The principal superiority of this method is supposed to consist, besides a great saving of time and expence, in the same quantity of hemp affording more tow. The value of the fuel as well as the time employed in the process, should however be well considered in such cases. It is likewise believed to promote the cultivation of hemp crops, by the facility which it affords to its preparation, even in such situations as are not contiguous to rivers, streams, or ponds, as well as to obviate any ill consequences that might possibly originate from the putrid effluvia of the atmosphere, and the corruption of the waters induced by it, which last are well known to destroy the fish contained in them, as well as to prove hurtful to cattle that drink of them.

Where hemp is left for feed, and not water-retted, in consequence of the great trouble and expence of the process, though it is unquestionably the best way to always have it performed, it is commonly stacked up and well covered for the winter season, in order that it may be thinly spread out about January or in the following month. Where this can be executed during the period of a snow, the hemp comes much more readily to a good colour, and forms strong coarse cloths, but is far inferior to that pulled in due season, and which undergoes the water-retting operation as noticed above.

Various contrivances have been made, in the form of ponds and pits, for the steeping of hemp, but one which seems to possess much merit, is described in the Norfolk Report as the invention of Mr. Rainbeard, by which the hemp is deposited in the pit without the necessity of a single person being wet. The pond is an old marle-pit with a regular slope from one side, (where the hemp is prepared,) to the depth of eight feet on the other side; on the slope above the water, the hemp is built into a square stack, upon a frame of timber of such a height, as will float and bear a man without wetting his feet; this is slid down upon the frame into the water, and when floating drawn away; a person on the opposite bank drawing the floating stack to the spot where it is to be sunk, and on which it is built to the requisite weight. The inventor "finds it does soonest at bottom, and would not object to sixteen feet of water. By means of this very useful contrivance he can put in a waggon load in an hour." The sheaves are taken out one by one in the usual manner; but it is suggested that some more expeditious and simple contrivance is here requisite for effecting the purpose, either on the principle of the lever or some other.

In preparing hemp for the tool denominated the *beckle*, the work is chiefly executed by the *betle*, and by first having recourse to a coarse, and then a finer brake. But the labour is capable of being more expeditiously performed by the rollers of a lint-mill. In either mode shaking the handfuls frequently with smartness is particularly necessary. In cases where it happens that the hemp has not been sufficiently watered, hand-peeling becomes necessary.

There is another method in use, which is that of the hemp-mill, much used by the Americans. It consists simply of a large heavy stone in the form of a sugar loaf, having the small end cut off. Thus shaped, it readily moves round in a circle, when passing upon a plane. It is impelled by the power of a water-mill, when the hemp being deposited upon the receiving floor, it becomes perfectly crushed and broken by the weight of the stone in its different revolutions.

The fluted rollers of the lint-mill are however without doubt

doubt the best means of performing the work, provided sufficient care be taken to guard against accidents while it is going on.

As soon as the hemp has been completely broken, another operation becomes necessary, which is usually denominated *fwingling*, or *scutching*, the intention of which is to separate the reed from the hemp.

This is executed chiefly in two different methods. The first is by the labourer taking a handful of hemp in his left hand, and while holding it over the sharp edge of a board, striking it with the fine edge of a long flat straight piece of wood, usually termed a *fwingle hand*, or *scutcher*. This method is, however, both laborious and tedious in its performance; of course others have been had recourse to, such as mills moved by water, having a number of *scutches* fixed upon the same axle-tree, and which move with great velocity. The work is in this case executed with great expedition and far less fatigue to the workmen, but there is a great waste of hemp, in consequence of the prodigious velocity by which the mill is moved.

Before the hemp, prepared in this manner, is subjected to the heckle, it mostly undergoes another process which is termed *beetling*; by which the fibres of the hemp become more loosened and divided. The beetles employed in this intention are moved either by the power of the hand or that of water, which is by much the best.

Produce.—The quantity of produce in crops of this nature is extremely various according to the goodness of the land, and that of the cultivation which is bestowed upon it. In some districts, as that of Suffolk and some others, it is said frequently to rise to forty-five or fifty stones, and sometimes more upon the acre; while in others, it often does not exceed twenty-five. It has been stated that the average crops of this kind, when prepared for the heckle, are from thirty-eight to forty stones of fourteen pounds each. And that the expence is commonly from about 7*s.* 6*d.* to 8*s.* or 9*s.* the stone, exclusive of the bounty allowed by government, which not unfrequently comes to 15 or 20*s.* more the acre. In the county of Norfolk the average crop is about 40 stones, and the price about 12*s.* the stone water-retted; and 9*s.* dew-retted. The usual prices for seven years were 6*s.* dew-retted, and 8*s.* water-retted. In Scotland the produce and prices are nearly the same as in the above county.

In standing for seed, the quantity is generally eleven or twelve bushels the acre, and the prices commonly from 4*s.* to 6*s.* the bushel.

However, though the expences of the cultivation of hemp crops are very considerable, on account of the soil, labour, and trouble which they require, the value which they afford in the produce, mostly repays those who engage in raising them in a pretty ample manner.

It has indeed been suggested by the writer of one of the Northern Reports, that this will prove a profitable crop to the farmer, who has greatly the advantage over the importer of foreign hemp, which, over and above freight and risk, is liable to a heavy duty, as that of 2*l.* 4*s.* per cwt. when dressed, and 3*l.* for such as is undressed. But the chief advantage of this sort of crop is conceived to be that of its capability of being brought to many times the value of the original raw material.

It has been stated that the most beneficial time for the cultivator to dispose of crops of this description, is while they remain upon the land, just before the season of pulling them, as in this way he wholly avoids the great trouble and uncertain expence of the several operations which are necessary in preparing them for the market, as well as the inter-

ruption which they are apt to throw in the way of other sorts of work.

It cannot be doubted, from what has been stated above, but that hemp may be grown in many districts of this country with great profit and advantage; and that the extension of its cultivation would be of vast national benefit. This cannot however be accomplished while the price of wheat keeps up to its present height, unless proper encouragement were given by means of bounties. But if this were the case, it would, in all probability, be much had recourse to, as it is found to afford an excellent preparation for wheat crops. This would unquestionably take place, if such encouragements were held out for any suitable length of time. In places where its cultivation is carried on to the greatest extent, it has been confessedly found of much utility to the poor, in furnishing them with full and constant employment. And in all situations where there is much necessity for sail-cloth, cordage, netting, &c. its culture would be of vast benefit, if duly encouraged in preventing the money which is paid for these articles from going out of the country.

The necessity of attending more fully to the culture of hemp crops in this kingdom, is indeed rendered more imperious by the increasing difficulty of obtaining foreign supplies, as well as by the insufficiency of the various substitutes which have been adopted.

It does not appear that the ancients were acquainted with the use of hemp, in respect of the thread it affords. Pliny, who speaks of the plant in his Natural History, lib. xx. cap. 23, says not a word of this; contenting himself with extolling the virtues of its stem, leaves, and root. In effect, what some writers of the Roman antiquities remark, *viz.* that the hemp necessary for the use of war was all stored up in two cities of the western empire; *viz.* at Ravenna and Vienne, under the direction of two procurators, called *procuratores linificii*, must be understood of linum, or flax.