## COMMUNICATIONS, &c.

I. Observations on the various Modes of inclosing Land. By Robert Somerville, Esq. of Haddington.

## PRELIMINARY OBSERVATIONS.

INCLOSING has long been considered, and very justly, not only as a certain means of improving waste and uncultivated lands, but also as an essential requisite to the completion of improvements upon the best soils, and such as have been long under tillage. For, whatever care or expence may have been employed in clearing, draining, tilling, menaring, wording, does how been of the benefits resulting from these can never be completely united, while the soil remains in an open uninclosed state. When the felds are in grass, they cannot be pastured to advantage without fences; and when they are in tillage, the crops, of whatever kind they may be, are exposed to every injury that can be suffered from the encoandments of sheep, extite, or other animals.

In many of the counties throughout Great Bratain, the features of this improvement are strongly marked, and the ideas of shelter, ornament, and increased produce, are visible to even the most superficial observer, and afford a very just comparative estimate of the advantages to be derived from inclosing, by contrasting the value of lands that are inclosed, with others of the same quality, that still remain in an open-field state; the saving in point of labour, the perfect security to the crop while the lands are under tillage, together with the warmth and shelter afforded to the stock and herbage, when the fields are in pasture, form a striking contrast, when compared with the open, unsheltered, unprotected, and unproductive state of uninclosed fields.

Obvious as these advantages are, 11 is to be regretted, that the system of inclosing, has, in 100 many instances, met with much opposition; and even in those cases where its benefits are clearly ascertained, much difference of opinion still exists, with regard to the patture of the fences requisite for different situations, the materials or plants that should.

be used, the best mode of executing them, and the season of the year most suitable for doing the work.

The opposition so often made to bills of inclosure brough into parliament, is a very striking proof of the former, and the linle judgment hat is shew in a commondating the fence to the natural circumstances of the fields to be inclosed, is conclusive as to the latter. It too often happens, that proprietors and farmers, without duly considering either the nature of their soil, or its local situation, resolve upon, and adopt a mode of inclosing, which they have seen successful in other places, without once considering that the soil, eliment, and other circumstances, which combined to render the plan successful in the situations they wished to copy, are totally wanting in theirs. Owing to this, much money is often expended, and many attempts prove abortive; the system of inclosing falls into discredit; and is considered as impracticable in many cases, where good and lasting fences might be reared as the same, perhaps less, expence than such as have failed. The reason commondy assigned, is the rigour of the climate, while the true and only cause is, the ignorance, or want of discernment in the persons who make these unsected all attends.

The mistakes committed in this way are innumerable. Sometimes live fences are planted in situations, and upon soils, where it is impossible they can grow, far less arrive at perfection; and where substantial stone fences could be made, not only at little expence, but the building of which, by collecting the stones, would rid the adjoining surface of a nuisance, and remove an incumbrance which too often constitutes a material bar to its cultivation. The discernment necessary to discover this is not great; notwithstanding which, we too frequently have occasion to observe large fields inclosed, either with dwarf, crabbed, ill grown hedges, and rotten decayed palings, or with turf or earthen mounds, obtained by paring off the best part of the surface soil, while the fields (thus wretchedly inclosed, by fences, which, on account of their inutility and perishable nature, must one day be abandoned) are covered with numerous large stones, the removal of which is an essential requisite to their improvement. The same circumstance often happens where live fences might be reared, which, in every instance where they can be brought to perfection, are to be considered as preferable to every other. In place of making the hedge with such plants as are suited to the soil and climate, they are often directly opposite, dwarf, stinted, white-thorn hedges being very frequently seen upon cold wet lands, and in bleak exposed situations; upon which, if beech, black-thorns, or crabs, had been planted, they would have

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grown readily, and made complete fences in a very short time. In other instances, the fence fails, or becomes faulty, from circumstances which the planter may be disposed to consider as immaterial. For example, in inclosing a large field, a great part of the outline of which is wer, if white thorns are planted in the ordinary way upon the common surface they will never make a good fence; whereas by planting them in the face of the bank of earth thrown out of the dirch, being thus raised above the level of the field, and placed upon a dry bed, they thirtye, and soon establish themselves: while upon very dry lands, with open bostoms, that possess little capacity for retaining moisture, the hedge very often dies, from an opposite cause; when the plants are set upon the mound raised above the common surface, if the season is but commonly dry, their growth is considerably impeded from the want of moisture; and in severe winters, from the porous nature of the soil, the frost gets access to the roots, and either kills whole rows or lines of hedges in a few weeks, or so far hurts them as to check their futurer growth.

In perusing the different County Reports, the whole of the surveyors concur in opinion as to the utility of inclosures; but it is mentioned by several of them, in terms of regret, that the obstacles thrown in the way of this valuable improvement, by ignorance and obstinacy, are great and manifold. In some cases they speak in terms of the highest panegyric of the utility, cheapness, and durability, of certain fences, such as quicks, beeches, crabs, &c. when they are planted upon the soils to which they are respectively the best adapted: while in others, they mention, in pointed terms, the perishable nature and transitory value of many of the fences employed; the annual expence required to keep certain descriptions of them in repair (the dead bedges and palines), and the great extent of valuable ground that is occupied by the others; especially the inclosures made by double ditches with a bank between them, and a hedge on each side; and of the common hedge and ditch, and hedge and bank, which, at the same time that they occupy a considerable space of ground, are very seldom good fences; in some instances covering thrice, and in others four times, the space, that a fence of a different kind would do, if properly kept. Great contrariety of opinion also prevails in regard to making trees a part of the inclosure, either in hedge rows or belts of planting: from such diversity and opposition of sentiment, it is difficulty to form any fixed or certain opinion upon the subject. Without pretending to offer arguments that will either inform ignorance, or remove prejudice, it is proposed in this Paper, to present the reader with a detailed account of the various fences now in use, as collected from the different

Surveys; and simply to state the method of erecting them to the best advantage, together with the advantages and defects of each.

It may not be improper, however, previously to state, the various points to which the proprietor or occupier, ought to pay particular attention, before he commences any plan of inclosure. These points are,

1st. The nature of the soil.

2d. Its present worth, and the increase of value expected from inclosing it.

3d. The objects to be attended to in making inclosures; and whether the greatest value of the fences is expected to arise from their simply confining the stock, or from their affording shelter to both stock and crop, or from the union of shelter and inclosure.

4th, The modes of inclosure suited to the natural circumstances of the soil.

climate, &c.

5th. The materials for making the fences, and the means of obtaining them.

The expence, another important point to be considered, must depend upon so many local circumstances, that it is impossible to form any estimates that could be of much service.

In regard to the durability of the fences, and the shelter they respectively afford, some observations on those heads, will be laid before the reader, when the several sorts of fences are described.

Nature of the Soil.—A careful inquiry into the nature of the soil, seems to he one of those requisites essential to the success of every plan of inclosure; for though there are, comparatively speaking, few situations, however elevated above the level of the ocean, and searce any description of soil, where a good live fence may not be reared, with one sor of plant or another; yet it is an object of the first importance, to know the plants best suited to every variety of soil; as, by a judicious choice of these, much loss and difficulty is avoided, and good substantial fences are made in a short time; and in many situations, where, from a mistake as to the plants employed, the fence has languished for years, and ultimately perished, nothwithstanding every care that could be bestowed upon it. In some instance, we have known tverty years experience, hardy sufficient, to undeceive those who have made mistakes of this kind. In the ever a case, however, where this obstinacy has given way to common sense and observation, and where the plants of which the hedge was originally made, have been taken up, and othern better adapted to the soil substituted in their room, these last have, without much trouble, made a good fence in a very abort sone of time.

When the plants commonly used in the formation of hedges come to be spoken of, an opportunity will be afforded, of detailing the different kinds, and the soil for which they are respectively best adapted, together with the means of managing them to the best advantage.

Present Value of the Soil, and probable Increase from inclosing it .- In every plan of improvement, whether by inclosing or otherwise, it is very material to ascertain the present worth of the estate, and the probable increase of value that may be expected from the undertaking; for unless this point is judiciously weighed, the operations will proceed at random, and much labour and expence may be incurred, without any adequate advantage resulting therefrom, . For much, and justly, as the advantages of inclosing are extolled (and they are unquestionably great), there are certain circumstances of soil and local situation, that bid complete defiance to this and every other attempt at improvement. For example, in high rocky situations, where the soil is not only thin, but of a bad quality, where the lands can never be subjected to the plough, and where the herbage is not likely to be much ameliorated by shelter, little benefit will be derived from inclosing. The only advantage resulting from the practice in such cases, seems to arise from the saving of a shepherd's wages, which, when the stock are pastured in an inclosed field, is rendered unnecessary; but which, if accompanied with no other advantage, will be found a paltry equivalent for the expence of inclosing the soil. On the contrary, however high or exposed the situation may be, if the soil is of a good quality, and a species of plants can be met with of a nature so hardy as to bear the climate, the value of the property will be so far improved by the shelter arising from the fence, as amply to compensate the expence incurred in making it. In many of the bleakest and most exposed situations in Britain, the soil, though greatly elevated above the level of the ocean, is equal in quality to what is met with even in the most favoured situations, and for the most part requires nothing but shelter, and judicious culture, to render it highly valuable. In detailing the different kinds of fences, especially that known by the name of hedge, and belt of planting, an opportunity will be taken of pointing out several instances, where this mode of inclosing has benefited the property so inclosed, in a tenfold proportion, in a very few years. Upon this point, it remains only to hint, that every person, whether proprietor or farmer, should, before he commences his operations, pay very particular attention to the present value of the property, in an uninclosed state, and the extent to which it may be improved by inclosing; as without such previous knowledge, in place of being repaid by the pleasure

arising from seeing the property ornamented and improved in proportion to the trouble and outlay of money, large sums will often be expended, without adding to the general appearance of the country, or materially contributing to augment the value of the oil

The Objects to be attended to in making Inclasures.—In some situations, all that is required is merely the confinement of the stock; in others, shelter to the stock and herbage is the principal object; but in a great majority of cases, the union of both is necessary, to complete the system of inclosing. In mild low situations, perhaps a stone wall, or a low thorn fence, will answer every purpose required, and produce every benefit that could be expected from the inclosure; yet these fences, would be found totally incompetent to the purposes of inclosure, in the hilly and upland parts of the country; for though confining the stock might be completely answered by either, the important requires of shelter would be entirely wanting.

Other matters of equal importance ought to enter into the consideration of persons inclosing. The separation of the soils incloued, so a to render that of each field an enally as possible of an uniform quality; the separation of stock as may be thought most advisable, together with the securing a sufficient supply of good water, are requisites as essential to the success of the undertaking, as to entite them to a high degree of attention. When that branch of the subject, the advantage arising from inclosures, comes to be condidered, these will be dwelt upon a some length.

Modes of Inclosing suited to the natural Circumstances of the Soil.—This matter has been in some degree discussed in the preceding article. There cannot remain a doubt that the success of every attempt that is made in the way of inclosing, must in a great measure depend upon the discertiment of the person who undertakes it. A material consideration in such cases, is to determine whether line or dead fences are the most eligible, or beat suited to the natural circumstances of the soil. The former comprehends every fence made with growing plants; the latter includes not only the different kinds of real of additional plants; the latter includes not only the different kinds of real of additional plants; the latter includes not only the different kinds of soil of additional plants; into this estimate ought also to enter, the comparative usefulness and darability of each, togetier with the first class, vie. live fences, where the plants are properly chosen, and well adapted to the soil, are uniform in this respect, that under proper management, their value is yearly increasing; while that of even the best constructed dead fences, is annually growing lets. Where they constant of dead hedges or palings, their decay is

certain, and commonly rapid; and even when they are constructed with stone and lime, which are by far the most durable of that class, though they make perfect fences at once, and the proprietor or occupier enters into immediate possession of every advantage that can arise from them, yet from the hour they are built, their decay commences; and after the first few years, a regular and progressive expence is incurred to keep them in repair.

Finces wited to the Uplands.—In all upland situations, the first class of fences will be found the best: of that class however, the beech hedge, and hedge with a belt of planting, deserve a preference, as they unite in the highest degree the important requisites of shelter, ornament, and inclosure. The beech, under proper management, attains a great size even upon the poorest soils, and soon forms a useful fence, in situations, where thoms and other kinds of bedge plants would either perinh, or remain in a dwarfish state; with this additional material advantage, that by keeping its leaves during the winter, it affords shelter to the stock and pasture at the most clement season, and when it is most wanted.

Fines adapted to the lower Parts of the Country.—In low situations again, where little is to be apprehended from the want of sheiter, thorn bedges kept low, or any of the different kinds of snore walls, will answer every purpose: and as the soil, in these low situations, is for the most part of very great value, those fences, from the little space they occurs, will be found preferable to every other.

Materials for making Fracet.—In the foregoing observations upon the modes of inclosing soited to the natural circumstances of the soil, we have pointed out what appeared the best, upon the supposition that the materials could be readily obtained at a reasonable price. In many situations, however, the searcity and apparent wans of many of these materials forms an almost insuperable obtased to inclosing upon the plan above hinted at: for instance, in the remote parts of the kingdom, where the different kinds of trees and hedge plants are either very scarce, or not attainable but at an enormous price, it will foften be found necessary, in the inclosing of upland districts, to surround the fields with stone walls in place of hedge or hedge, and belt of planting; and in not a few situations in the low lands, whore stone walls would be the most eligible fence, from the scarcity of that article, bedges, or hedge, and dich, are had recourse to. Under such circumstances, necessity is the law, and the person inclosing must accommodate his plants to his resources.

It will, however, frequently happen, that the materials wanted will be met with upon

the spot, not only without expence, but with much advantage to the property; as in cases where the fields are infeated with stones, their removal will at once facilitate the improvement of the field, and furnish good materials for inclosing it. But even where the resources are less visible, and there are no stones upon the surface, by a careful examination of the substratum, plenty may be met with; or in defect of these, clay for making either bricks or mud-walls may be had merely for the trouble of digging.

With regard to the other kinds of dead fences, such as palings, dead hedges, &c. materials for constructing them may be procured in almost any situation, from the thinnings of young plantations, from coppices, and the cutting down of old hedges; even the deficiency of hedge plants and young trees might be, in a great measure, if not entirely, got the better of, if every proprietor were to have a small nursery for raising them for his own use, and that of his tenants. To the convenience and saving of expence, with which this practice would be attended, we have to notice an unspeakable advantage, viz. that arising from the use of plants propagated in, and inured to the climate where they are afterwards to grow. It must require little knowledge of the subject to convince any one, that plants of whatever kind, reared in the upland and hilly parts of the kingdom, will thrive better than such as have been reared in the warmest and most sheltered spots. To what are we to ascribe the amazing size, and luxuriant growth, of many trees in the Highlands of Scotland, or even in Norway, and North America, but to the circumstance of their having come into existence, in the climate and situation where they were afterwards destined to grow; and by being thus early inured to the climate, became, to all intents and purposes, indigenous,

Plants suited to the Soil.—It is not the least important consideration with persons inclosing, after having determined whether live or dead fences should be used, to make choice of the plants best suited to the soil. In the flat low parts of the country, where the soil is loamy, or gravelly, and at the same time moderately dry, and not greatly exposed to any prevailing wind, white thorus will be found both the chepest and the best. Hazel, elder, and a multitude of others might be used for that purpose in these situations; but, as we shall afterwards have occasion to remark, they are liable to objections which the thorn is not. If in these low situations, it is meant to plant trees along with the fence, either in hedge rows or belts, the dry soils should be planted with ook, ash, tim, plain tree, chemant, fore b, &cc. and the moist parts with poplars, and the different kinds of willows; by such means the whole will three, and in a short time become valuable to the proprietor. In the uplant and hilly parts of the country, unless.

the soil is very wet indeed, the hedge plans should consist either entirely of beeches, or a mixture of beech and larch; the last is known to answer well in these exposed situations, and not only endures plaining and elipping without nigray, but thrives remarkably under these operations; where the soil however is wet or spongy, a different description of plants should be used; willows of different kinds, poplars, birch, or allar, will then be found the best; and ought, in preference to every other, to be made use of.

By thus adapting the plants to the soil and climate, few plans of inclosure will prove abortive in any situation.

Having premised these general observations, we shall now proceed to consider the present state of Great Britain in regard to inclosures.

From the perusal of the different Surveys now in possession of the Board of Agriculture, it appears, that in almost every county throughout the kingdom, considerable tracts of the soil are inclosed; and that many plans of additional inclosures, to a very considerable extent, are now in contemplation.

The surveyors appointed by the Board are unanimous in their approbation of the system, which they represent as so beneficial in its consequences, that in many cases the value of the property has been thereby increased in a fourfold proportion, and in some well authenticated instances, considerably more.

The fences at present in use, are of great variety; and a part of them, particularly such as have been made of late years, executed in a handsome substantial manner, uniting at once the important points of sbelter, inclosure, and ornament.

The appearance of these, owing to the judicious manner in which they are managed, convey to the mind the strongest ideas of permanent and valuable improvement.

The different kinds of stone walls, by having a broad foundation sunk deep enough in the earth, to place them beyond the reach of frost, tapering gradually upwards, and secured at top with a proper coping, are found to last many years, with but very slight repairs.

The bedges, from the circumstance of their being planted at a proper season, the plants made use of adapted to the nature of the soil, and afterwards kept in order by regular weeding and trimming, are of immense value, and form the most beautiful and lasting fences that can be imagined.

Many other descriptions of fences are equally perfect and valuable; but though these circumstances are mentioned with much satisfaction, and must give pleasure to every person who feels, or has the smallest interest in the improvement or welfare of his country, it is with pain we remark, that in too many instances, the system of inclosing is extremely defective; and much less solicitude has been shewn to secure and unite the whole of the benefits to be derived from it, than the importance of the subject deserves.

To confine the stock, seems in too many instances to have been the sole object, while the weightier matters of sheller, both for the stock and pasture, separation of soils, separation of stock, and many other points of equal importance, have been entirely overlooked.

In 100 many instances, no attention has been paid to the natural circumstances of the soil intended to be inclosed. High inaccessible walls, belts of planting, and hedge-rows of trees, being very often met with in the lowest and warmers situations, where little or no shelter is necessary; while in the hills and uplands, and along the sea coast, where shelter is indispensable, both for the tacks and pasture, and where its advantages are incalculable; the fence very often consists of a naked stone wall, which though it may, and indeed does, answer repurpose of confining stock, possesses no other advantage; and many tracts of immense extent, the value of which might be improved in a tenfold proportion, by hedges and belts of planting, exhibit a naked bleak appearance, and continue exposed to every blast.

The loss and disadvantage attending this injudicious mode of inclosing are strikingly obvious. In the low warm parts of the country, where the land is of immense value, much of it is occupied by fences which the nature of the situation does not require, while in the more elevated and exposed parts, where shelter is the sine qua non ofin-provement, and where the land occupied by the fence is, comparatively speaking, of small value, the fence, in place of affording the necessary shelter both to the stock and pasture, is barely adequate to the purpose of inclosing the field.

Under such circumstances, the passure will for the most part be scanty: and neither a breeding nor a feeding stock, will make half the progress upon it, that they usually do, in cases where they enjoy the benefit of complete shelter.

A defect equally injurious to the proprietor or occupier, and highly inimical to permanent improvement, seems to prevail in the choice of the materials of which inclosures are generally made. In every instance where circumstances will admin oif, present use ough, if possible, to be united with durability, in the formation of every fence; an attention to this, is too often totally wanting, both with proprietors and farmers. Provided the present purpose is answered, future consequences are disregarded: and neither

a knowledge of the perishable nature of the materials made use of, which daily experience presents to their view, nor the frequent and heavy expenses to which they are put for repairs, have been sufficient to make them after their system. Amongs these perishable fences are to be ranked, the different kinds of earthen and mud-walls, of turf, of turf and stone, together with the whole of the wooden fences, comprehending the different kinds of paling and death bedges.

The ancient custom of inclosing fields with high earthen banks, or mounds, sometimes with, and sometimes without a paling on the top, which prevailed formerly in many parts of England, and which is now pursued in the North of Scotland, though it did very well as a rude essay in the way of improvement, when other modes of inclosing were either unknown, or imperfectly understood, and might for a time answer the purpose, either of confining the grazing stock, while the field was in pasture, or protecting the corn crops when it was under tillage, is perhaps the worst and most perishable of all fences. After being reared with much labour, and committing a theft upon the adjoining surface, which is pared off to a considerable distance on each side. it remains but a very few months, or even weeks, in a perfect state: indeed from the moment it is made, it begins to decay; and the operation of the weather upon it, for a few years, renders it useless as a fence. Accordingly, in many parts of the Island, we meet with the remnants of such fences, which, though they were originally of considerable height, and to appearance strong and formidable, are now so completely beat down, and levelled by the action of the weather, as to render it in some cases a matter of difficulty for the curious to trace their foundations, or the direction in which they formerly ran. The case is the same with walls formed entirely of turf, or a mixture of turf and stone. These, though made at considerable expence, and, as has been already noticed, by tobbing the neighbouring surface, are equally perishable, as the simple earthen mound. Upon whole farms, and even estates, that were formerly inclosed with turf, or stone and turf walls, nothing now remains but their vestiges, which, while they exhibit a striking proof of their perishable nature, afford at the same time a salutary lesson to proprietors and others, to beware of such temporary expedients; as however cheap such fences may be in the first instance, in their best state they are but imperfect, and in the end are the worst and most expensive of any.

An equal defect prevails in many instances where the fence is entirely of stone.

Where the walls, in place of having a good foundation, sufficiently removed beyond
the reach of frost, broad at bottom, tapering gradually upwards, and finished at top

with a substantial coping of flags, stone and line, or turf, so formed as to prevent the decay of the building, are in many instances built upon the plain surface, with scarce any taper towards the top, and without any coping at all, except perhaps a slight one of turf, which soon moulders away, and, if the wall is built with lime or clay, permits the moisture to soak down and destroy it. The same improvidence and want of judgment discovers itself, in carrying these walls through every kind of soil, vet as well as dry. In the formation of extensive inclosures, it very often happens that a part of the line in which the fence is to run, is wet and spouv; in place of paying attention to that circumstance, discontinuing the wall where the dry land terminates, and either attempting to lay the spousy parts dry by draining, or plant a hedge of willows, poplars, or other plant adapted to wet soils upon the surface, it he wall is too frequently continued through the whole. The consequence (as may very naturally be expected,) is, that the wall, for want of a solid dry foundation, soon tumbles down, or is continually needing repairs.

Along with this inattention to the shape of walls, considerable loss arises from building them with round, or what are termed land-stones. These, from their shape, are ineapable of presenting a sufficient extent of surface to each other to bind them, or give stability to the building, by which means it seldom lasts long, though clay, or even lime is made use of. The expedient of mixing clay, is particularly inexpedient, as in general the first winter's frost, or a long continued series of wet weather, saturates the clay to completely, that the vall swells, bursts, and tumbles down.

The practice of inclosing with the different kinds of dead hedges and paling, is productive of equal lors, both to individuals and the community. Were these fences made to answer only a temporary purpose, such as protecting a young hedge, &c. &c. the loss would not be great, as their original value is small, and long before they were totally decayed, the hedges they were meant to protect would be so far advanced, as to make good fences without their assistance. From the pertual of the different Reports, however, it appears, that in many of the English counties, they are resorted to in easter where permanent plans of inclosing are intended, and are the only fence made use of. The surveyors who have noticed the practice are unanimous in their disapprobation of it, and represent the frences as perishable, and in the highest degree expensive. In several whole districts, dead hedges of different kinds form the only fence, and occasion an annual expence upon the property so inclused, amounting from a fifth to a tenth part of the rent. Nearly an equal loss and expence is incurred in inclosing or

with paling t what adds to the regret that arises from the observation of this ruinous practice, the soil and climate, in most cases where it prevails, are well calculated for the growth of live fences.

It is evident, that what is said above will be considered by the public at large as a represect, and will be felt as such by thuse concerned. We admit that the feelings of individuals ought, in every instance where it is compatible with the public welfare, to be respected; but where, either their opinions or practices are huntful to the country, or hostile to its improvement, they are justly reprehensible. Forbearance in such cases is vice; and though exposing their faults may, in some instances, cover them with shame, yet the task is necessary; and, by fixing the attention of the public upon the subject, has very often the effect of preventing the most serious abuses, and bringing about valuable improvements. If any thing that is now mentioned, it conductive, its the smallest degree, to correct the faults in the system of inclusing above enumerand, or to change the perishable dead fences, for good quick hedges, the purpose of these observations will be fully answered.

Wet Disches.—But to return to the subject. Where disches constitute the fence, either in their simple state, or as making a compouent part of another fence, such as ditch and hedge, &c. due attention has in very few instances been paid to secure every advantage that might be derived from their use.

Defects of them —Proceeding without judgment, the ditches in many counties are made equally deep and wide, upon wet and dry lands, from an erroneous opinion, that the drainage of the field, and the future prosperity of the hedge, require a ditch of certain dimensions. In place of laying off the field, in such a style, as to make the ditches subservient to the purposes of diratage, as well as inclosure, they are frequently dug at random, of an uncommon depth and width, with a high bank or mound of earth on the side next the field, so strong and thick, that no water can find its vay through it. In that vay, the ditch, in place of acting as an open drain for carrying off the water from the adjacent fields, set as a kind of barrier to prevent it from getting away; while from the want of a proper level and outlet, when once filled, it becomes a kind of reservoir; and by constinuing filled with water three parts of the year, chilts he roots of the hedge plants so much, that they either perish entirely, or remain small, stitted, and diseased. In this place it may be necessary to observe, that the use of ditches, as open drains, has in many instances been completely misunderstood. In most of the old inclosures they were thought valuable, only in proportion to the quantity of water

they were capable of containing, without considering whether they were so situated as to convey that water to a proper outlet. In the valuable and judicious Reports from the Counties of Ayr and Stirling (remarkable for their correctness and elegance), these deep and wide ditches are described, and their defects noticed: in the former county, they are from six to eight feet wide, and of a proportionable depth; and in the latter, they are in many cases upwards of twelve feet wide. The quantity of valuable ground occupied in that way, over such extensive districts, must be immense, and when to this is added, the injury done to the hedges from their roots being chilled, and the inconvenience arising from having a tract of country so much cut and intersected by these canals during winter, which prevents all passage through them, and the danger of their weak horses or cattle, or even unfortunate travellers, who mistake their road in the dark, falling into them (circumstances which unfortunately too often occur), together with the expence of making such deep excavations, it will readily appear, that the practice is bad, and that every purpose both of drainage and inclosure might be answered, at perhaps a fourth part of the expence, and without any of the risks or inconveniences we have mentioned. When we come to speak of ditches, notice will be taken of the proper mode of forming them, so as to render them subservient both to the purposes of drainage and inclosure, with the least possible expence,

Helget.—In many parts, the defective method of rearing and managing the bedges is no less striking. In place of making the whole hedge of one kind of plants, suited to the nature of the soil, and such as, when arrived at a certain age, are capable of making a good fence, the inclosure is frequently surrounded with a mosley mixture of shrubs, many of which, even in the most perfect state, are unfit for making a fence, while others, though they might have answered that purpose pretty well, if the whole fence had been made with them: yet from the circumstance of their being mixed with others, which not only come into leaf, but also shake their leaves as a different season, both burt each other's growth, are offinaive to the eye, and take from the general appearance of the country. Such, however, are the fences in some parts of the fines countries in England, where, upon the top of a high bank that has been raised by robbing the sdiploining ground of its soil, a muley bedge, consisting of various plants, is met with, full of gaps filled up with stones or dead wood, forming a very insufficient fence, either for the purpose of confining the stock, while the field is in pasture, or of protecting the crops, while its under tillage.

In other cases, where the plants of which the hedge consist are of one kind, it too

often lappens that they are by no means suited to the nature of the soil. For example, in inclosing a large field, where a part of the line of fence is perfectly day, and a part of it wet and swampy, in place of planning quick, or white thoms upon the dry spaces, and willows, poplars, birches, or such plants as thrive in damp situations upon the wet parts, the whole field is often surrounded with thoras, greatly to the burt of the proprietor and occupier; as upon the dry land the thorus thrive, and in a few years make a good fore, othing the plants to the soil, planning the plants, with a little judgment in accommodating the plants to the soil, planning quicks upon the dry land, and willows, pepilars, &cc. upon the spenty and swampy parts, the whole would thrive, and there would be no defect in the line of inclosure.

To this missike (a wan of judgment in accommodating the plants to the soil) is to be ad-led, the defects which commonly take place in the after management and training of hedges. It is now well known, that the whole or the greatest part of the plants of which hedges are made, if left to themselves without pruning or weeding, runs up to a considerable height, grow broad and bushy at top, and become upen and naked at bottom. To prevent this, there is no remedy known, but that of culling over the main stems of the plants, of which the hedge consists, after they have attained a certain height, and pruning or trimming the lateral branches in such a way, as to preserve the bedge thick and broad at the bottom, and give it a gradual taper towards the top.

But in place of this management, the hedge, in most instances, after being planted is abandoned to its fate; and neither weeding, pruning, nor indeed any other attestion bestowed upon it: in that way, a number of the plants are either choked by weeds, or remain in a dwarf stitunced state; and such as survive this usage, are allowed to shoot up at random, and soon attains a great height without being useful as a fence; and by the spreading of their branches at top, not only become naked and open below, but cover three times the trace of ground that belees differently hent usually do.

Having dwelt at some length upon this important branch of the subject, we shall now proceed to give a detailed account of the different fences at present in use, the mode of making them, together with their respective advantages and defects.

The following list comprehends the greater part, if not perhaps the whole of the fences at present in use in Great Britain.

It is proposed to divide them in two elasses, namely, the simple and the compound: the simple fences consist of one kind only, such as a disch, a hedge, a wall or paling, without the addition of any thing clse; while the compound fences are made by the union of two or more of these, such as bedge and ditch, bedge and wall, bedge and paling, &cc.

## Simple Fences.

- I. Simple ditch, with a bank on one side.
- II. Double ditch, with a bank of earth between.
- III. Bank of earth, with a perpendicular facing of sod.
- IV. Ha-ba, or sunk fence.
- V. Palings, " or timber fences of different kinds, viz.
  - Simple nailed paling of rough timber.
  - Jointed horizontal paling.
     Upright lath paling.
  - 4. Horizontal paling of young firs.
  - 5. Upright ditto of ditto.
  - 6. Chain fence. 7. Net fence.
  - 8. Rope fence.
- VI. Dead hedges, various kinds.
- VII. Live bedges. VIII. Walls.
  - Dry stone wall, coped and uncoped.
    - Stone and lime ditto, coped and uncoped.
  - g. Stone and clay ditto.
  - 4. Stone and clay harled, or dashed with lime.

- 9. Flake or hurdle fence.
  - 11. Fence with growing posts, 12. Shingle fence, horizontal.
  - 13. Ditto upright.
  - Warped paling.
     Open paling warped with dead thorns, or branches of trees.
    - 5. Dry stone ditto, lipped with lime. 6. Dry stone ditto, lipped and
      - harled.
  - Dry stone pirned and harled.
     Brick walls.
  - 9. Frame walls.
- A Architects, surveyors, and builders, commonly upply the term pales, to sawn boards miled verically in finese, exclusive of the posts and rails. A polded funce therefore constitute of these parts 1st, posts; ad. rails; and, gally, pales. It is only when the pales are miled on to the rails, and the latter framed into posts which are faced in the growned, that it is proprily called a paled finese. In this work the word paling, however, it taken in a more extensive sense, implying timber fences in general.

10. Galloway dike, or wall.

12. Turf and stone in alternate layers.

11. Turf walls.

13. Mud walls with straw,

## Compound Fences ..

t. Hedge and ditch, with or without paling.

without paling,
a. Double ditto.

Double ditto.
 Hedge and bank, with or with-

out paling.

4. Hedge in the face of a bank.

5. Hedge on the top of a bank.

6. Devonshire fence.

7. Hedge, with single or double paling.

g. Mud walls with straw.

Hedge, and dead hedge.
 Hedge and wall.

10. Hedge, ditch, and wall. 11. Hedge in the middle of a wall?

12. Hedge and ditch, with row of trees.

 Hedge, or hedge and wall, with belt of planting.

 Hedge, with the corners planted.
 Reed fence, or post and rail covered with reeds.

Having thus enumerated the different kind of fences, we proceed to a separate detail of each, their nature and advantages, and the best method of constructing them.

Simple I mees. 1st. of Ditches in General,—Though disches now form a part of that class of fences which we term compound, yet in their simple and original state, they were considered rather in the light of open drains; and, in place of being looked upon as a fence, their greatest benefit was supposed to arise from their receiving, or carrying off the superfluous moissinger from the inclosed field.

In a variety of instances, ditches are made for this purpose only, where there is no intention whatever to inclose the field. They are, bowever, sometimes means as a fince, but in such cases they are made very deep, and wide; and the earth taken out of them is sometimes formed into a bank, the height of which, when added to the depth of the ditch, forms a tolerable barrier; in general, bowever, the greatest value of the ditch is met with, when it is used in conjunction with other fences, as will be seen under the second class,—compound fences.

Form of Ditches.—The form of ditches is very various, some of them being of a uniform width both at top and bottom; others are wide above, and have a gradual slop downwards; a third kind have one side sloping, and the other perpendicular. For whatever purpose the ditch is means, the sloping form is by much the best; as it not only

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costs less money in the digging, but is at the same time much more durable, and has a nearer appearance.

Where open ditches are indispensably necessary for the drainage of the field, the sloping ditch is preferable to every other; as the sides are not liable to numble in or be undermined, or excavated by the current of the water, when properly executed. The slope should be considerable; perhaps not less than three times the width at top, that it is at bottom. When we come to speak of hedge and ditch, the advantages of this construction will be more particularly noticed.

The openditch, with the will or perpenditular sides, is liable to much objection, both in its single and compound state: in its single state, the sides are perpetually tumbling in, especially after frosts or keny rains, and if the field round which these ditches are made has any considerable declivity, the bottom is undermined, and large masses tumble down, biriging the hedge along with them. These circumstances are of threnches sufficient to bring this kind of ditch into discredit; but while they are thus improper as open drains, owing to the circumstances we have mentioned, their shape is the best possible for a covered drain, as the broader these covered drains are at bottom, the more water will key earry off; with this additional benefit, that by being broad belop, they are less liable to choking, or obstruction, than if they were narrow; in which case, a single stone or two clapping close together, will so for interrupt the course of the water, and so much sand and mad will accumulate behind them, as to render the drain useless: whereas, when there is a sufficient breadth at bottom, if the water fiss do stone, it readily finds a passage elevahere.

- 1. Simple Ditch, with a Bank of Earth. This fence is represented, Pt. I. Eg. 1. and consists merely of a ditch, sloping gradually towards the bottom; the earth taken out of fit, is generally formed into a bank on one side, leaving a scarcement, or projecting space, of six or eight inches on the side where the bank is formed, to prevent the earth from tumbling in, and filling up the ditch.\*
- 2. Double Ditch, with a Bank between.—This fence is represented by fig. 2. Pl. I. It is not often that the double ditch is used, unless in cases where it is meant either to plant hedges, or trees, on the bank between the ditches: in some cases, however, double
- In place of which the figure represents the earth gathered into heaps, and smoking: explanatory
  of the practice in some of the English counities, of burning the clay taken out of ditches, and using it
  as manure.

ditches are made, where there is no intention whatever of planting either hedges or trees, and in several instances are highly valuable.

Considered as a fence, it has an evident advantage over the single ditch; as the earth taken out of the two ditches, when properly laid up in the middle, forms a pretty steep bank of a formidable appearance; which, without any other addition, makes a very tolerable temporary fence.

For the purposes of open drainage, the double ditch is excellently adapted, especially by the sides of highways, where the lands have a considerable declivity towards the road; the ditch next the field, by receiving the water on that side, prevents it from overflowing and washing the road, a circumstance which very frequently happens in such situations; while the ditch on the side next the road, by receiving and carrying of the moisture that falls upon, and which would otherwise lodge there, and destroy it, keeps it constantly dry and in good repair.

The double dich is also useful in dividing high, from low flat lands, particularly where the high grounds slope very suddenly down upon the low fields; that, next the high ground, by receiving the water from it during heavy falls of rain, saves the inferior grounds from inundation, while the ditch on the other side serves as an open drain for the lower fields.

We trust it will not be thought foreign to the present subject, to mention, that where double diches are made in the immediate vicinity of high grounds, or on the cide of highways, care should be taken to prevent the water from the furrows, or side drains, from running into the main dich at right angles: where this is neglected, much trouble and inconvenience arises; as when the water comes from the height, during heavy rains, in a straight line into the dich, it presses with accumulated force against the sides of it; and if the soil is of a loose incoherent nature, the bank will be undermined, and wahed away in many places. To prevent this, nothing more it requisite than to alter the direction of the furrows, or small side dichets, a few yards from heir opening into the main dich; and in place of permitting the water to fall upon the bank in a straight line, to give the furrows, or side ditches, a gentle curve; by that means, instead of falling into the dich in a straight line, and acting against the bank in the manner we have described, the furrows will empty themselves into it, in an oblique direction; and by joining immediately with the stream in the ditch, will be prevented from having any bad effect upon the bank.

It is obvious that the water, by thus having its direction changed, can do no harm

to the sides of the main ditch; and what is of advantage, the earth and sediment brought along with it from the high ground, intend of being deposited in that place, where the cuts enter the main ditch, which seldom fails to be the case, where the water falls into it in a straight direction, is earried off along with it; and though this sediment ultimately falls to the bostom of the ditch, yet, as it falls down gradually in its course, it is equally divided over the whole, and occasions no obstruction in any particular part.

3. Bank of Earth, with a perpendicular Facing of Sod, and a Slope bebind.—This fence is represented in P. I. fig. a, which shews the section of a high road with a bank on each side, with a perpendicular facing of turf. It is very common, and is in some situations extremely useful; in making folds, for instance, for the confinement of abecp or cattle; it is also avisable on the sides of highways, for defending the adjointing fields, and for laying off clumps or belts of planting, in the middle or corners of arable fields, for incloning stack-yards, cottages, gardens, &c.

The front of the bank is made with the sod pared off from the surface of the sloping dich, and the mound at the back with the earth taken out of it. In all cases where this fence is used, the perpendicular front should be made on the outside, and the bank, on the inside of the field. But when it is employed for folds, the front should be on the inside of the fold; as in that way, it will not only present a much more formidable appearance to the sheep or cattle, but the depth of the ditch will be an addition to the height of the bank; and the earth taken out of it being laid behind, will serve as a kind of butress to support the facing of sod, and give it a degree of firmness and durability, far superior to that of the common turf walls, or fold dikes, as they are generally termed in North Britin.

When this fence is properly constructed, a work at which the labourers are now pretty expert, it lasts a considerable time; but in its most perfect state, it is only to be considered as a temporary expedient; for however neat it may appear, or however well it may answer the purpose at first, it ultimately loses its value. In speaking of compound fences, notice will be taken of the cases in which this may be introduced with propriety, as making a part of any of them. Where wood for paling is scarce, or cannot be had, and where other materials for the shelter or protection of young hedges are equally scanny, this may be used with advantage for a time, and will both shelter the young hedge, and inclose the field; but where permanent plans of inclosing are inended, it should never be had recourse to, as however cheap it may be in the first instance, it is value is transfore.

4. Ha-ba, or sunk Fence. (Pl. I. fig. 4.)—The sunk fence is calculated chiefly for fields that require no siteler, and where a uniform unbroken prospect is an object, as is the case in gardens, and extensive lawns; but in all situations where shelter is wanted, the sunk fence ought to be avoided, unless a hedge is planted upon the too of it.

The form of the sunk fence very nearly resembles the mound of earth, with the perpendicular facing of turf, just now described; with this difference, that the facing of the former is stone, and the height of the fence depends entirely, or in a great measure, upon the depth of the ditch. These sunk fences are either faced with dry stone, or stone and lime, and are of various heights, according to the ideas of the proprietor, or the circumstances of the case. In the Report drawn up on the Northern districts, page 27, of the account of Cromarty, the following description of the sunk fence is given, which we beg leave to transcribe.-" Upon the line where this fence is intended, " begin to sink your ditch, taking the earth from as far as eight feet outward, and "throwing it up on the inside of the line, This ditch and bank is not made quite per-" pendicular, but inclining inwards towards the field as it rises; to this is built a facing " of dry stone, four feet and a half in height, one foot and three quarters broad at " bottom, and one foot at top, over which a coping of turf is laid: the ditch, or sunk 44 part, forms an excellent drain. The whole of this is performed, when the stones (we " shall suppose) can be procured at a quarter of a mile's distance, for 6d. per yard." Advantages of Ditches .- It has already been observed, that none of the different

kinds of disches, taken by themselves, are to be considered as good fences, with the single exception of the sunk fence, which we are under the necessity of classing along with them. This last answers the double purposes of an open drain, and a face. But hough disches in their simple state are thus defective as fences, their use is attended with many advantages, not only in draining the field, but in affording a supply of earth; which under proper management may be converted into excellent manuer. Where the soil in which disches are made is deep, and of a good quality, the earth taken out of them, if it is either made into a compost with lime, or dung, or even spread by itself upon the adjoining fields, will greatly increase their fertillity, and prove a lasting and valuable improvement: even where the soil is most or clay, it may be converted to the ame valuable purpose by borning; most being burnt, and the ashes used as a manure, in many parts of the kingdom, and clay also. In the marshes of Soncries, the clay taken out of the disches and burnt, is found, upon strong transcious soils, to be highly valuable, as it breaks their cobasion, and by that means renders them not only

less retentive of moisture, and of course easier cultivated; but also much more favourable to the growth of plants, by affording room for the roots to extend, and stretch themselves out in search of food.—Their value, as making a part of any of the compound fences, will be seen when we come to speak of that class, under the articles ditch and bedee, &cc.

6. Palings or Timber Fences. Of Palings in general.—In all permanent plans of indosure, palings are only to be considered in a secondary light; for of whetever substantially they may be executed, or in whatever situation they are placed, their decay commences the instant they are created. The alightest attention will be sufficient to convince every person of observation, of this truth. Where permanent use therefore is required, palings ought never to be adopted; but for ornament in pleasure grounds, or for the protection of young thorns, they are highly valuable. When the different kinds of paling come to be spoken of, notice will be taken of the mode of constructing each; but as there are certain circumstances, which may be considered as common to all palings, this is judged the most proper place to mention them.

In all cases, where either dead hedges or palings are used, the decay and ultimate loss of the fence, is owing to that part of it, which is let into the ground, being rotted by the moisture.

Where dead bedges are planted, it is no easy matter to provide a remedy against this evil; as the stems are so numerous, that, to give each of them a preparation that would complexely defend it from the effects of moisture, would be attended with an expence equal to, if not greater than the value of the fence.

Where palings, however, are used, especially the most expensive and substantial kind of them, and such as are meant both for duration and ornament, it is desirable to prepare the standards, or upright parts that are placed in the earth, in such a manner as will enable them to resist the moisture for many years.\*

It has been a practice time immemorial to burn, or cbar, that part of the standards of palings intended to be driven into the earth: the reason assigned for this practice was, that the fire hardened the parts thus subjected to it; and by rendering them

• In the South of England, the post is always more bulky at the lower end than the upper, and is faced in the ground by digging a hole, placing it therein, shovelling the soil in, and ramming it round the post till it be firmly faced. impervious to moisture, made them more durable than they would have been without such operation.

But the best defence at present known against the effects of the weather, is the bark of the tree. This scoring in has from nature; and it is possessed of every requisite that is necessary, being impregnated with oil, resin, and other matters, which secure it completely, not only against moisture, but other injuries arising from the operation of air, light, heat, &c.; of this we have strong proofs, by observing what happens where the bark of any tree is destroyed, by cutting off a branch, or otherwise. If the surface laid bare by the wound it considerable, the body of the tree opposite to it begins immediately to decay, and continues to wate, unless some covering is made use of to supply the place of the bark; for that purpose, nothing has yet been found so effectual as a cost either of boiled oil, or of oil paint; which, by completely excluding both air and moisture, not only preserves the tree from rotting, but also prevense it from bleeding, and wasting tistelf, by an effusion of juices from the wound.

When trees are cut down and sawn into planks, whether for palings, or any other purpose, where they are afterwards to be exposed to the weather, the same thing happens, that we have mentioned as taking place with the growing tree, when deprived of its bark, but in a much greater degree; as the whole surface is then without a covering. To prevent this decay, the same remedy should be applied, vix. painting the whole of the wood, or otherwise filling the pores with oil, in such a manner as to prevent the entrance of moisture. There are now coarse oil paints sold of all colours, so cheap as to enable persons erecting palings, or other works of wood, to paint them at a small expence; another very good remedy is to be had at a moderate price (Lord Dundonald's coal varnish), into which if the points of the standards that are to be drove into the earth, are dipped while the varnish is boiling hot, it will preserve them from the bad effects of moisture for a very long time; previous to the dipping, they should be properly sharpened, and upon no account whatever charred or burnt, as every attempt of that kind will, upon inquiry, be found to injure the texture of the wood, and hasten its decay. This application, which has been found highly valuable for many purposes, and for which the noble discoverer is entitled to the gratitude of his country, has only one fault namely, that it does not penetrate deep into the wood; and after being laid on a few months, is very apt to scale, and throw off with frost, or the action of the sun; it has the farther disadvantage of hurting the appearance of the wood, and giving it an old, black, decayed look. Common tar, or melted pitch, may also be successfully

employed for the purpose of defending the extremities of the upright parts of paling from moisture; lingered, and train oils may also be used with success; the great object being to fill the pores completely with some unctuous or greasy matter, so as to prevent the admission of moisture.

The pouts should be completely dry, before they are dippedin any of these preparations; for if they are either made of green wood, or have imbibled much moissure; if, after being dipped they are exposed either to the heat of the sun, or a severe frout, the moisture will become so much expanded thereby, as to burst through, and bring off the coat of paint and varnish &c.; whereas, when they are made of well exsoned wood, and are at the same time perfectly dry, and the pitch, oil, varnish, &c. boiling hot, it readily enters the poes, and by filling them completely, prevents the access of moisture. In a few instance, a method different from any of these has been tried, and found

in some degree to answer; instead of sharpening the points of the standards, they are left of the same thickness at both ends, and the extremities, instead of being drove into the earth, in the ordinary way, are let into large stones sunk into the earth, with round or square holes cut into them, of such a size as to admit the square ends of the posts. In that way, the upright posts of palings certainly last longer than when they are drove into the earth without any preparation; by that the difference of durability in the two cases bears no kind of proportion to the difference of expence; and as these stones are sunk into the earth, and of course within the reach of the moisture, the decay of the paling, though somewhat protacted thereby, is in the end equally certain.

Upon the whole, when the expence and durability of these different methods are compared, it will be found by much the best way to drive the standard into the earth, after having previously prepared them by dipping the extremities into any of the articles we have mentioned; and of which we think any of the coarse oils by far the best. In addition to which we have to add, that this dipping and preparation should be so applied, as to fite several inches above the surface of the earth after the standard is drove in; for if no more is dispeed than what is drove into the ground, the wood will inhibbe the mointure at the surface, and very soon rot and decay at that place.

Thus much of the preparation of that part of the wood which is drove into the earth. To render the whole paling as durable as possible, it should receive a covering, either of Lord Dundonald's varnish, or one of the coarset kinds of oil paint, or oil. Where use only is wanted, and the appearance of the paling is not an object, a cost of varnish or oil will answer very well js taw whon a paling is made of dressed wood, substantially out will answer very well js taw thon a paling is made of dressed wood, substantially and the paling is made of dressed wood, substantially the paling is made of dressed wood, substantially the paling is made of dressed wood, substantially the paling is made of dressed work. excuted, and no sight of the road, or of a gentleman's house, it becomes necessary to unite use with ornament. In such cases a cost of white, or gene oil paint, will defend the wood equally well, and look much better; where it is intended that the paling should appear visible at any great distance, and convey an idea of inclosure, the white paint should be used; but when it is meant to conceal the fence, and give an unbroken view of extensive lawns or pleasure grounds, the green paling is preferable; next to the hasha, or sunk fence, it is the best contrivance for that purpose; being of the same colour with the grast, it is not visible to the eye at any great distance.

Having thus mentioned, what appeared very essential respecting palings in general, we now proceed to notice the different kinds of these, and offer some observations on each.

1. Simple natited Paling, or Fence. (P. 1. f.g., 5.)—The naited paling consists of upright posts, drove into the earth at certain distances, and crossed in three, four, or more places, with pieces of wood in a horizontal direction. This paling is for the most part made of coarse, salvn wood, without any dressing whatever; in Scotland it is termed a slab paling, and is the one commonly employed for the protection of hedges, and for strengthening directe, &c. For temporary purposes it answers extremely well; but where dutability is required, and where no other fence is used, it will be found a very first and no insufficient fence.

Jointed bor scontal Paling, or Fence, (Pl. I. fig. 6.)—The jointed horizontal paling, consists of massy square poles drove into the earth at regular distances, through which mortises or openings are cut, for the reception of the extremities of the horizontal pieces which traverse them. When properly executed, this fence has a neat and durable appearance. It is, however, much less so than it appears to be, as the points of the piles drove into the earth soon rot, and the morities, or openings cut in the body of the piles, for the reception of the horizontal pieces, weakens them very considerably, so much so indeed, that in very many instances, the paling fails fast at those places where the joinings or morities are made. Where valuable palings of this kind are made, there is an easy method of faseding the horizontal to the upright parts of the paling, without cutting or weakening any part of the upright posts. This consists in fastening the cross, or horizontal bars, to the upright posts with it for assets were every purpose that can be expected, from binding and connecting the different parts of the fence, have not the smallest tendency to diminish the strength, or acclerate the deavy of any part of it.

3. Upright Lath Paling. (Pl. 1. fig. 7.)—The upright Lath paling, Is made by driving a number of strong piles into the earth at regular distances, and crossing these at top and hottom with horizontal pieces of equal strength; upon these last are nailed, at from six to twelve inches distance, a number of square pieces of sawn wood, of the share and size of the laths, that are used for the roofs of tilde houses.

This paling when properly executed looks very well, and notwithstanding its apparent slightness, if it is well supported by props or rests at regular intervals, lasts a long time.

Where there are planations of young firs in the neighbourhood, laths may be had at a trifling expence; and for the protection of young hedges, &cc, this will be found superior to almost every other, as the closeness of the upright pieces will prevent the sheep or cattle from putting through their heads between them, and cropping the young bedge, an advantage which horizontal palings do not possess.

For gardens it will be found both useful and ornamental, and infinitely better adapted to the training of fruit trees and currants, than the common espalier rails.

4. Horizontal Paling of young Firs, or the weedings of other young Treat. (Pl. I. fig. 8.)—Upon estates where there are exentive woods, or where they are surrounded by belts of thirving planting, the thinnings of these woods or belts, will be highly valuable for making palings, especially when the plantation consists chiefly of first: the palings of young firs are of two kinds, viz. horizontal and uppids. The horizontal resembles the jointed dressed paling described, fig. 6, the upright is similar to the lath palings. In the sketch that is given, the young firs of which fig. 8, and 9 - are formed, have their lateral branches cut off at about three inches distance from the trunk. This has several advantages, viz. that of rendering them stronger than they can possibly be, when the lateral branches are cut close by the trunk; the labour required to prune them is also less, and they make a better fence than such as are close trimmed, as the sharp projecting points prevent the sheep or eastle from leasing or rubbing upon them.

The upright palings of young firs, (Pl. II. fig. 9.) in place of heing made in the manner above described, and as represented in the sketch, are sometimes made by driving the upright parts into the carth, and overring them at the top with a piece of flat sawn wood, through which holes have been previously bored, with a large auger, to admit the sharpened points of the upright piles; this forms a very neat paing, and when well secured with reats at the back, lars a very considerable time.

6. Chain borizontal Fence. (Pl. II. fig. 10.)-The chain fence is made by fixing a

number of strong square piles into the earth as regular distances, in the direction in which the fence is to run; each of these piles has three strong staples or iron hooks, drove into it on each side, one near the top, one within 18 in sheeks of the bostom, and one in the middle; to these stuples or hooks, thains are fastened and stretched horizontally, in the same manner as the pieces of wood are in a common horizontal wooden fence. When it is meant, that the fence may be laid open for any temporary purpose, books are drove into the posts in place of staples, and the chains hung upon them; but where this is now swanted, the staples will be found the most secure.

In some cases the upright part of this fence, in place of wooden piles, such as we have described, consists of neat pillars of mason-work, with hooks or staples batted into them, for fastering the chains to; these when properly executed look extremely well, and last much longer than the wooden posts.\* For the confinement of horses or cattle, a chain fence will answer very well, and if the pillars are of stone, will be very durable; but will be found totally unfit for inclosures, where sheep, hogs, &c. are meant to be pastured; it is besides so very expensive, that it never can come into general use. In avenues, however, (Pl.11. fig. 11.) and public walks, and for stretching across rivers, and pieces of water where there are no floodgates, and where no other fence can be made to complete the inclosure, they will be found preferable to every other contrivance.

7. Net Enter, (P. II. f.g., a.)—The net fonce is chiefly used in shrubberites and pleasure grounds, and consists, like fig. 10.0 of a number of square piles of wood drove into the earth at regular distances, each of which has a couple of holes b wed through; to one at top, and another at bottom, large enough to admit a rope about twice the size of a man's finger; these ropes, after being drawn through the holes, are stretched the whole length of the fence, and well secured, and upon them a strong net is fastened, of a length and breadth suited to the fence, either by sewing, or tying it at regular distances with strong cord or rope yarn, at top and bottom; it is farther secured below, by one or more wooden books drove into the earth between each of the piles; this completes the fence; to render it durable, not only the piles, but also the net and ropes, should be covered with a coat or two of good oil points. When well finished, this fence.

In a few instances the purpose of posts is answered very completely by large growing trees, into which hooks or stuples are drove for fustening the chains, as in gentlemen's avenues, public, walks, &c.

has a very pretty appearance, but is neither a durable nor useful one, as sheep and cattle readily tear and destroy it with their horns, and in many instances, the sheep get themselves so much entangled, that in struggling to disengage themselves they are either much hurt, or entirely strangled. In point of utility, the net fence has nothing to recommend it; but as it will in many instances give a next finished look to pleasure grounds, we have given it a place here.

8. Repe Fence. (Pl. II. 16, a 13).—The rope fence is nearly the same as the former, that is, it consists of upright posts, drove into the earth at regular distances, with holes borted through them for the ropes to pass; in general, they consist of three, and in some cases of four courses of ropes, like the chain fence. This can only be used for confining earther of rose; for sheep, they will be found quite incompetent; for stretching across rivers, or pieces of water, as has been noticed when speaking of the chain fence, the ropes will be useful, or even for adding to the height of a stone, or turf wall, especially the latter, into which if posts are drove at certain distances, and one course of ropes put through them, such an addition will render a very insufficient fence, secure and valuable.

One observation seems necessary upon the subject of this fence, namely, that the perforating of the posts for passing the ropes through weakens them considerably; notice has already been taken of a similar mischief, in the jointed horizontal paling, or posts and rails fiamed, and a remedy pointed out, vie., that of fixing the cross bars, or horizontal pieces to the upright parts by staples. In the rope fence this may be resorted to with equal advantage, as staples or ring-hosts drove into the wood, answer every purpose, without impairing in the smallest degree the strength of the posts.

g. Moreable wooden Fence, Flale, or Hurdle, (Pl. II. fig. 14,1)—The stake, or hurdle fence has hitherto been principally employed in cases where abeep or caule are fed with turnips in the field, to divide a certain portion of their food at a time; in that way they are extremely useful, as the sheep or cattle, by having a given quantity of food allowed them at once, eat it clean up without any loss, which they would not do if allowed to range at large over the whole field. There are, however, many other purposes to which flakes may be applied with equal advantage. In the grazing of a large, field, for instance, when the sheep or cattle are turned upon it early in the spring, they tread down and destroy a great deal of the grass, and by dropping their dung and urine upon the remainder, injure it so much as to render it unpalatable to the stock; in that way a great proportion of the grass is lost in every field of any condictable texter.

whereas, when the stock is first put upon the field, if a flake fence were run across a small part of it, as is the case with turnips, and the grazing stock kept there till they had eaten the herbage clean up, they would then, from necessity, cat a great deal that is entirely lost when they are permitted to range over the whole field. In that way considerably more stock might be fed upon a given space than is done at present. It is to be observed, however, that the first space divided off by the flakes should be next the water, especially if the field is grazed by black caule or horses, and that progressively; as the stock removed from the watering-place, a lane should be left by which the caule could travel to the pond.

It is also to be noticed that, after the first space allowed to the grazing stock is eaten clean up, as soon as they are shifted to a new place, a course of flakes should be placed behind them, to prevent them from going backward upon the pasture that has already been eaten bare; hy this management the whole of the herbage, upon every space allotted to the stock, will not only be completely eaten up, but by dividing or fencing off that part which has been caten, the plants are allowed to recover, and long before the whole field is gone over, the space first eaten will be in a situation to receive the stock a second time. By this me had the dang and urine of the stock, instead of rendering the herbage nauscous and unpalatable, and thereby preventing them from eating it, will by its fertilizing powers assist its growth, and render it sooner fit for being eaten a second time, and by that means afford three or four crops in the space of a year instead of one. Experience has sufficiently evinced the great profit and advantage that attends the practice of teddering cattle or horses upon good pasture, or of feeding them in the house with cut grass; the benefit in both these cases arises from the whole of the herbage being completely eaten up, without any part of it being lost. The same benefit, but with infinitely less trouble, may be reapt from flaking grass fields; every possible advantage will be made of them in that way; and in very many instances it will happen, that before a half or two-thirds of the field are gone over by flaking, the part first eaten, will be in a situation again to receive the stock : by that means a part of the field may be saved for hay, or if the views of the occupier are of another kind, the number of the grazing stock may be increased.

It may, and no doubt will be argued by many, that this management will be attended with much trouble and expence; and after all that the profit resulting therefrom will be but small, and scarce prove an equivalent for the trouble and extra-expence. From the acknowledged value of Baking, however, in the consumption of

turnips, cabbages, &cc. and the great profit which arises from giving the stock, only a certain quantity of food at once, and withholding any more from them till that is eaten up; some idea may be formed of the vast advantage that would attend the flaking of a grass stock.

We by no means, however, wish thee observations to be underatood as applying to grass pastures of every description, quite the contrary; as there are many situations where the expence and trouble of flaking, would prove more than an equivalent for any advantage that could be reaped therefrom.

We have only to add, that upon all rich passures, the benefit arising from the practice of flaking, will be found very considerable, and a single experiment will be sufficient to convince the most incredulous.

- 10. Osier or Willow Fence, or wattled Fence, (Pl. II. fig. 15.) This fence is made by driving a number of piles, of any of the different kinds of willow or poplar, about half the thickness of a man's wrist, into the carth, in the direction of the fence, and at the distance of about 18 inches from each other. They are then twisted, or bound together at the different places, with small twigs of the willows or poplars, as represented in the sketch. This kind of fence has some advantages peculiar 10 itself; it not only forms a cheap and neat paling, but if it is done either about the end of autumn, or early in the spring, with willows or poplars that have been recently cut down, the unright parts or stakes will take root, grow, and send out a number of lateral branches; and if pains are taken the following autumn, to twist and interweave these branches properly, a permanent fence, so close as to be almost impenetrable, may be formed in two or three years. For the inclosing of marshy lands, or for completing any inclosure, where a part of the line in which the fence ought to run is so wet as to be unfit for the growth of thorns, or the building of a wall, the willow paling will be found an excellent contrivance, and the use of it will render many inclosures complete, that would otherwise be faulty.
- 11. Paing of growing Treas, or rails nailed to growing Posts. (P. 11. fg. 16). This paling is made by planning beach, larch, or other trees in the direction of the fence, at about a yard distant from each other, more or less as may be thought necessary; these trees should be provested by a common deed paling, till they are ten or twelve feet high, when hey should be cut down to ais fert, and warped or bound together while willows at top, and in the middle; the cutting off the tops will have the effect of making them push out a great number of lateral branches, which, if properly warped

and interwoven with the upright part of the trees, in the manner described for the willow fence, will both have a beautiful effect, and will at the same time form a fine fence, which in place of decaying, will grow stronger with time, and may with very little trouble be kept in perfect repair for ages.

18, and 13. Horizontal, and upright Shingle Fenest. (Pl. 111. fig. 17, and 18.)—
The shingle lence is chiefly made of firs, coarsely sawn in deals, of from half an inch
to an inch thick, and of different breadth secording to the diameter of the tree 3 preut
strong square piles are drove into the earth, and the deals nailed horizontally upon
them, in such a manner that the under edge of the uppermost deal shall project or lap
over the upper edge of the one immediately below it; the fence, when finished in this
manner, will have nearly the same appearance as the bottom of a boat or cutter.
This description will be well understood by those who have been in North America,
where not only the roofs, but the walls of many of their houses are made with shingles.
When completed, this fence is nearly as formidable as a stone wall, though, as may
naturally be supposed, it is much less durable.

An upright fence is sometimes made with shingles, which when properly excuted looks extremely well, and is indeed highly ornamental; this fence is made by fixing perpendicular posts in the earth, nailing three pieces of wood horizonally, and covering these with shingles placed perpendicularly; in this case the shingles are not above three inches broad, and the extremities of each are pointed at the top. Several fences of this kind are to be seen upon the road from Edishuppin to Glagow, specially upon the property of Sir W. Cunningham of Livingstone, Walter Campbel, Esq. of Shawfield, and some others. These upright shingle fences are painted white, and have a very handoone apporaance.

It is seldom that inclosures of any considerable extent have been made with these shingle fences; for folds they answer extremely well, and can be shifted with as much case as flakes from one field to another; they are also useful for temporary purposes in gardens, &c.; and where turnips are eaten with sheep upon the field, these shingle fences will be found preferable to the common open flakes, from the shelter they afford to the sheep.

14. Warped Paling. (Pl. III. fig. 19.)—This paling consists of pieces of wood drove into the earth, bent down in different directions, and their tops fastened together, as in the sketch; this fence resembles the chevaux de-frise, with this only diffuence, that in place of leaving the points standing up, as is the case with that part of fortification,

they are bent down and tied together. When made of dead wood, this fence is equally perishable with others of the same description; but when made of growing plants, it will be found a very valuable one.

15. Light o'yn Frace with Thorns, or the Branches of Trees were is. (Pl. III. fig. 20)—I his paling differs from the common nigiled fence alreacy described, only in beling warped either with thorns, or the branches of trees. When properly done, it forms at once a very complete fence; but like all fences made with dead wood, it will be found very perishable, and require many repairs. It has, however, one advantage, vize that when properly executed, it is proof against the entrance of any animal whatsoever.

Dotal Hedger. (Pl. III. fig. 21, &cc.)—Dead hedges are made with the prunings of trees, or the tops of old thorn or beach hedges that have been cut down, and are principally intended for temporary purposes, such as the protection of young hedges, till they have acquired a sufficient degree of strength to render them fencible without any other assistance, for this purpose the dead hedge is well adapted, and I tass so long as to enable the live fence to grow up and complete the inclosure. In many cases, however, dead hedges are had recourse to as the sale fence, and where there is no intention of planing quicks, or any other hedge. From their very perhabile matter, however, they are found to he exceedingly expensive, so much so indeed, that after the first or second year, they cannot be kept in repair at a less expence, than from a fifth to a tenth part of the value of the land, and sooneimes move.

When dead hedges are meant for the protection of young live frenes, if he quick fence is planted upon the coamon surface, the dead hedge is muche in a trench or furrow immediately behind it, in such a way as to prevent the sheep or eather greating in the inclused field from hijstring it; where the quick fence, however, is planted upon the side of a dirich, the dead hedge is for the most part made on the top of the mound, formed by the earth taken out of the dirich; these are ealled plain dead hedges, belingmately to unsing the horner, or hrushwood of which they comist into certain longlat, and putting them into the earth. We call them plain, in opposition to other descriptions of dead hedges where more art is used, such as the dead hedge with upright stakes wattled, and the common plained dead hedge, bomed together at the top with villows; of which the reader will be able to form a much better idea, that can we'll be conveyed by words, by observing the skeetbers.

Fig. 21. Represents a dead hedge inclining a little, placed upon the plain surface in the ordinary way.

Fig. 22. represents the common dead hedge, which is almost the only fence in several of the English counties, with the thorns, or dead wood let into the earth about twelve or fourteen inches, and fastened at the top with willows or hazels.

Fig. 23. wattled dead hedge, with strong upright posts, or what is generally termed stack and rise, or in Scotland, stake and rue.

This last, and the one immediately preceding it, form very handsome fences; it is only to be regretted that they are not permanent ones, seldom lasting above a year or two: this defect is complained of in many of the Reports, particularly that of Lincolnshire: the words of Mr. Stone the surveyor are, page 34, " Dead fencing supplies the "place of live, which occasions an exernal expence to the occupier, 1st., in purchasing " the fencing stuff, and bringing it from a considerable distance; and adly, in the delay " of his interest, by reason that the land occupied by a dead fence, might sustain a live " one, which would not only answer the present purpose; but in place of decaying, " would be annually improving."

The truth of this observation cannot be disputed, as the soil and climbre, in almost every situation where these dead hedges are chemplained of, are such that hedges of live plants would not only grow, but could be made at equal, perhaps less expence than these temporary erections, and with this advantage; that in place of decaying, and occasioning an endless loss and expence for repairs, they would be every year growing stronger, would require little expence to support them; and in place of the forlorn decayed appearance which dead hedges never fail to give a country, they would at once shelter and ornament it.

It cannot therefore be too strongly recommended to proprietors and famets, in those parts where dead hedges are at present so much used, and so justly complained of, to substitute live hedges in their place; the expence of doing so will be trilling, and the benefit arising therefrom immense. In carrying a plan of this kind into execution, there is no occasion to throw such fields as are at present inclosed with those temporary fences open, quite the contrary, the dead fences ought to be preserved, till the young plants thave attained used a strength, and size, as to enable them to form a good fence, without any auxiliary sid: in that way, the inclosure will not only be preserved, but the dead fence, from the shelter it will afford to the young plants will accelerate their growth, and render them much sooner useful, than they would otherwise be. This change of system would be at once pleasant and profitable to all concerned, the expence of indosing, which is at present serverly fell, would be done away, the

appearance of the country considerably improved, and the public benefited in a great degree: and as no doubts can be stated as to the practicability of this scheme, we trust that the bare mention of it, will be sufficient to dictate a better system of inclosing to those concerned. The idea entertained by some landlords, that, provided a farm is once let, with the usual burden upon the tenant of supporting the fences, the nature of the fence is of no importance to them, deserves the strongest and most pointed reprobation; indeed, it could scarcely be supposed, that men who have a permanent interest in the property would reason in this manner. There can be no doubt if lands are let to a good tenant, for a term of years, that the landlord is certain of drawing his rent during the currency of the lease, whatever the expence of supporting the fences may be: but if this tenant is a man of sense, the offer he makes will proceed upon the value he has in his own mind, formed of the nature of the soil, and the expence which must unavoidably arise from cultivating and sheltering it, and bringing the produce to market: the farmer who has not made, or is not capable of making such a calculation, can never be a desirable tenant to any proprietor; but if the tenant possesses this necessary knowledge, the yearly rent he will offer for the farm, will be less in proportion to the sum, which he expects annually to expend in constructing or supporting these fences: we trust slender observation is necessary to convince intelligent proprietors or farmers, that the substitution of live, for dead fences, will not only make the inclosures more perfect, but will make an addition to the annual value of the property, equal to, if not greater than the expence at present incurred, in keeping these dead fences in repair.

It need hardly be added, that as the greatest value of these fences consists in their completing inclosures, and sheltering the young bedges, till they arrive at a certain age, they should never be thought of, by either proprietors or farmers, except for these or other temporary purposes.

Of Live Hulgen.—Live hedges are made either emirely with one kind of plants, or a mixture of different kinds, and for that purpose almost every tree or shrub, known in Bristin are either wholly or in part employed. In a subsequent part of this Paper, some account will be given of each; but as there are certain circumstances common to all of them, and upon which the success of every attempt made to rear good fences will be found ultimately to depend, this seems the proper place for mentioning them.

These circumstances are.

1st. The plants suited to the soil and climate.

- ad. The preparation of the soil.
- 3d. The time and mode of planting.
- 4th. The age of the plants.
- 5th. The size of ditto.
- 6th. The dressing, or pruning of the tops and roots before planting.
  - 7th. Weeding, and hoeing ditto.
- 8th. Pruning, and after management.
- o'h. Filling up gaps in hedges.
- 10th. Diseases to which hedge plants are liable, and the remedy,

1st. Plants quited to the Soil, Climate, &c.—Upon the proper choice of plants united to the soil and climate, where the hedge is to be made, the success of every astempt to inclose with live fences will be found to depend.—A mind given to observations, and capable of applying these observations to useful purposes, will receive considerable assistance upon this point by attending carefully to the indigenous trees, or shrubs which thrive bett, and attain the greatest size upon particular soils, and in certain climates: by an attention of this sort, many plants, which are seemingly of small value at present, might be rendered highly useful by planting hedges with them.

But though an observation of this kind will in some instances serve as a guide, and lead the person who makes it to certain useful practices, it is not always to be depended upon, as there are many situations where neither trees nor shrubs, fit for making hedges, are to be met with in an indigenous state, and even when they are met with, their nature will not admit of their being tramplanted.

Formately in these care, though nature affords no guide to assist us in the choice of the plants, we will find sufficient direction from the experience of the country, by carefully noting the circumstances of soil and climate, under which certain plants that have been introduced into them have prospered, and either risen into trees, or made good fences. In the observations prefixed to this Paper, notice has been taken of the great loss which attends the fence, and the plants of which it consists, not being properly adapted to the natural circumstances of the soil they are meant to inclose; many nistakes of this kind might be enumerated, especially in the more elevated situations, where great labour and expence have been employed to raise hedges of hawthorn, which after many years care and attentions, were found totally until for

these inclement regions. In such situations, experience has now sufficiently proved that good fences can be reared in a short time, with beach, birch, larch, and the Huntingdon willow; hedges of these, ought therefore to be the only ones used in hilly countries, or upon cold wet soils; the three first upon the dry soils, and the last, with the addition of poplars, upon such as are wet or marshy.—In the low country, however, and in the less elevated parts of the uplands, the white thorn will be found the best upon all the dry, or moderately dry parts of the soil, especially the different kinds of loamy, sandy, or gravelly lands; upon elays, or cold wet soils, however, beach, erab, bireh, poplar, willow, and alder may be used with advantage. The birch, poplar, adder, and Huntingdon willow, are peculiarly ealculated for the coldest, wetten, and most marshy parts; while beach, erab, &c. will be found to answer best upon the stiff clays.

Hazel, sweet-briar, rowan tree, and indeed all the different kinds of forest trees, that are at present known to delight in dry soils, may also be employed for making hedges in the low lands with success; but which ever of these is used, they should if possible be without mixture. In the preliminary observations formerly referred to, notice is taken of the motley appearance, and small value of many hedges in England, made with these mixed plants: it is seldom indeed that any soil, however good, will be found equally favourable to the growth of plants, so very opposite in their nature; this circumstance alone will render their growth unequal, and of course make the fence faulty and defective; these defects in the fence, and inequalities in the growth of the plants, will increase with time, become every day more apparent, and be every day more sensibly felt; as the plants, that have thus acquired the ascendancy, will continue to keep it, and not only shade the weaker ones, and prevent them from enjoing the influence of the sun and air, but also deprive them of nourishment. Independent of these considerations, there is another of equal, perhaps greater moment, that requires to be mentioned; allowing the soil to be equally favourable to the growth of the whole plants, of which the mixture eonsists, there are certain plants which are highly inimical to the growth of others, when planted in their immediate vicinity; ivy and honeysuckle, for instance, when mixed with thorns, or other plants in a hedge, never fail to destroy such of the hedge plants as they fasten upon; indeed moss, which is known to be one of the worst enemies to all hodges, is not more dangerous or more certainly ruinous: even the different kinds of sweet-briar, brambles, &c. have the same effect, and in the end never fail to produce a gap in that part of the bedge where they grow, by corroding and smothering the thorns.

nd. Preparation of the Soil for Hodges.—The preparation of the soil for hedges, and even plantations, though at present shamefully neglected, is nevertheless one of those points infinitely connected with, indeed essential to their success; except in a very few instances, however poor the soil may be, or however strong the cohesion of its parts, no attempt is made either to brack that cohecion by tillage, or improve its quality by enriching or alterative manures. The young plants being for the most part laid upon the old surface, which has perhaps never been opened by the labour of man, and their noos covered with the earth taken out of the ditch, consisting very often, of the poorest and coldest till, or of earths loaded with iron, or other metallic intergnations.

To hose who have considered the matter with the smallest attention, the fate of such a hedge will not appear doubful; the surface upon which the plants are laid, will be so hard and impervious to the roots, as to preclude the possibility of their penetrating it; of course their only chance of either extending themselves, or procuring nourishment, is by preading out between the unface, and the mound made by the earth taken out of the disch, or by striking up into the mound, where, though the soil will be sufficiently open, to admit of this, the roots, in place finding an establishment in a situation friendly to their growth, will very often be either starved or poisoned.

In the culture of the grain, and the whole of our most useful and valuable vegetables, proper preparation of the soil by tillage and manures is deemed indispensably necessary; and experience has sufficiently evinced, that upon the perfection of the tillage, and the quality and judicious application of the manures, the success of the farmer, or gardener, and the value of their crops, entirely depend.

Is it not strange, that the same farmer who is convinced of the utility, and necessity of tillage and manutres for his other crops, and who would think himself for ever disgraced, were he to sow a plans, grain, or any other useful vegetable, upon an arapiaegbed, dirty, unmanutred field, should, without shame or compunction, commit a hedge, which is no form the inclosure of the field, and upon which a considerable part of its future improvement is to depend, to the earth, without any one of these sids? Incredible as it may appear, this is certainly the fact, unless, as has formerly been observed in a few instances, where better sense and stronger observation have dictated a different management. It being the uniform custom in most plans of improvement, be the quality of the soil what it may, to mark off the line of the fence, dig

the ditch, and commit the hedge plants to the earth, without any previous preparation either by tillage or manures.

Perhaps our dwelling no long upon this subject, may be thought by some a waste of words and time, and that we have been labouring to establish a principle, the truth of which few would be inclined to dispute; but as the general practice is very opposite, and few people scene to be fairly convinced of the necessity, of paying proper attention to these points, we trust that the observations thrown out, will not be thought uscless or irrelevant: what remains is merely to point out the proper way of preparing the soil for the reception of a hedge, in such a manner as to render it useful as soon as possible.

In every instance where a hodge is to be made, the ground should be previously prepared by a complete summer fallow, in order to destroy the weeds; when this is accomplished, a certain proportion of dung, linu, or compost, should be laid on the tract upon which the hodge is meant to be planted; after this is done, and the manure properly incorporated with the soil, a furrow should be drawn with a common plough about the end of November; in this furrow the plants should be placed, and the earth thus impregnated with the dung, or compost, drawn up to, and troof firmly about their roots. When the soil has been previously cleared of weeds in this manner, and a sufficient quantity of manure bestowed, the hedge, if the plants are healthy, and suited to the soil and climate, may be committed to the earth, with every prospect of succes.

ad. Time and Mode of Planting.—Of whatever plants the hedge is made, they ought always to be put into the ground, either before winter, or very early in the spring before any vegetation takes place. In that way, if the plants have been carefully taken out of the nursery ground, and no material injury done to their roots by laceration, pruning, or otherwise, their growth receives searce any check, and they make more progress in one year, than they would do in three or four years, under different management. The beginning of November, or any time during the month of January, seems the most proper time for planting thorns.

The mode of planning differs in different places, and even in the same place, according to the nature of the hedge; when hedges are made in the face of a ditab, boath, mound, or wiail, it e universal practice is to lay the plants horizontally, either upon the surface, or upon a paring of sod or earth, taken from it; and afterwards cover upon the surface, or upon a paring of sod or earth, taken from it; and afterwards cover

them in such a manner, as that about seven or nine inches of their length shall be covered with the soil; and about three inches left projecting without it. In that way, stefficient room is left for the roots stretching out, and forming an establishment for the plant; while the part left projecting is so short, as not to be abbe to produce above two, or at the most three good shoots, which from the maillness of their number, will be vigoor rous and useful; whereas, if a greater length had been left without being covered, the shoots would have been much more numerous; and of courter weaker.

The future value of the hedge, depending entirely on the number and strength of the first about the plants make; we have already hinted at the necessity of preparing the soil properly, by tillage and manures, in this mode of planting, viz. upon the plane surface in the face of a ditte, hoats, mound, or walf, it is equally necessary as in any other, dung, littine, or compost, ought to the laid upon the tract, and pointed in with a spade; and in place of laying the earth taken out of the ditch indistriminately upon the roots of the thorns, care ought to be taken to cover them with the best of the surface moldi: by such treatment, having a well prepared, well manured, bed helow, and a covering of good earth above, the roots of the plants have not only abundant room to pread, but have also plenty of nourishment; this gives them a decided advantage at their first starting, and enables them to make more progress in two or three vears, than they would otherwise do in twice that time.

Hadge upon the common Stifue.—The mode of planting this bedge is very simple; a furrow about eight or nine inches deep is made with a common plough, upon the tract that has been previously limed and dunged to render the furrow as clean as possible, the plough should be drawn twice along it; one labourer then goes along the furrow with a bundle of plants under his arm, which be drops in handfilds of its or eight together at certain disances; when he has gone over, perhaps a hundred yards in this manner, he returns to the further end, where he began to drop the plants; and taking up the first handful, begins to set them in the bottom of the furrow, not in a direction perpendicular to the borizon, but inclining a few degrees in the same direction that the fence runs. These the labourer places, leaning against the perpendicular side of the furrow, at the requisite distance from each other, say, from four to siz, or eight inches; having placed the whole of them in this manner, he covers them with the earth from the other side, or that which has been turned up by the plough, when this operation is finished, he sets a foot on each side of the hedge, and beginning at one end of its, goes alowly along, treading the earth close to the roots of the plants at one end of its, goes alowly along, treading the earth close to the roots of the plants the whole way; the soil is then pointed with a spade on each side, which finishes the operations where the necessary pains have previously been taken to pulverize the soil, a single labourer will, with great ease and exactness, plant several hundred yards of thorns, or other hodge plants in one day.

Another mode consists, in one labourer receiving the plants by two or three at a time, from another who carries a bundle of them, setting them in the middle of the furrow, with the topreclining a little; and drawing a quantity of earth from each side with his foot to cover the roots: when about fifty or a bundred yards are done in this way, each labourer takes a common garden rake, and draws up a sufficient quantity of earth to each side of the plants; treading the surface with their feet as they go along, in such a manner as to bind the soil moderately, and at the same time set the plants in a straight line as straight line.

A third mode consists in harrowing the tract of the hedge, or raking it with a garden rake; then stretching a line along it, laying out a furrow with a pade, and afterwards planning the thorns, and laying the earth to them, in the manner described in the two former methods. Laying out a furrow with the apade in this manner, admits of the work being done with great nearness and accuracy; but it is attended with considerably more labour and expence, and after all, seems to possess no great superiority over planting with the plough.

In some cases the hedge is planted with the dibble; but as we shall afterwards have occasion to notice, this practice must be a bad one; for if the plants have the whole of their roots preserved, and are planted with a dibble, in place of the fibres being properly spread out, as they ought to be, they will be crammed together into a very narrow space, with their points staring upwards, or in other words, looking out of the soil, in place of dipping into it; or if by much pruning they are cut so close, as to be made fit for going easily into a dibble hole, their growth will sustain a severe check by such injudicions pruning: when hedges come afterwards to be spoke of, as making a part of any of the compound fences, the circumstances connected with the planting of each, will be more fully notice.

Age at which Hedge Plants ought so be used.—It is very common, especially where young hedges are made with quicks, to plant them of one, two, or three years old, seldom exceeding this last age. Plants of this description, when put into the earth at a proper season of the year upon land that is well prepared, and that are afterwards exressly kept clean, and the earth solt and loose, by regular weeding and digging, seldom fail to make good fences; such young plants, however, are long in a state of infancy, and require great nursing, and the most complete protection to bring them to perfection, and are liable to be either much burt, or totally destroyed by many accidents, that would produce little or no effect upon older and stronger plants.

It is the opinion of many sensible well informed people, that much time might be asaved in the rearing of bedges, and the fence be much more perfect and useful, if older plants were employed for that purpose. Three years old is certainly the youngset that should be planted, and if they are even six or sevenyears old, so much the better: the prevailing idea that plants of that age will not thrive if tramplanted, it totally mentioned; as with proper care they not only grow readily, but make excellent fences in one half of the time that younger plants usually do. With this additional advantage, that they are much less liable to be killed or injured by frost, drought, weeds, or the other easues that affect younger plants: thorats of six or seven years old, in place of being no thicker than a common straw, will be at a medium more than an inch in circumference; we leave those who are judges to determine, how far a plant of this last description will be superior to one of two years old, and how much sooner it will answer the purposes of a fence.

It is, however, very material to observe, that where plants of this age and size are used, the most complete care should be taken to preserve the roots as entire as possible. When we come afterwards to speak of the pruning than is necessary, before planting the different kinds of hedge plants, we will have oceasion to observe the mistakes that are at present committed in that way, and the mischief that ensues from an improper use of the knife.

Size of Thorax or ather Hedge Plantt.—Having mentioned the age that seems best calculated for the plants thriving, and forming a good bedge; we think it necessary to observe, that, when the plants are once obtained, they should be separated into sorts, according to their size and apparent strength, picking out the largest first, and so on downwards. This will be attended with several very material advantages, which those who have made observations on the subject, will very readily understand; plants of the same size and strength when planted together, keep pace with each other; no one of them takes from the earth more than its own share of nourishment, of course the growth of the whole is regular and uniform; and the hedge, when arrived at a certain age, become are a substantial efficient force, of an equal height throughout, and fee

of any gaps: whereas, when no pains have been taken in ausoring the plants, and they are planted promiscuously, great and small, strong and weak, the consequence is, that the strongest plants very soon outgrow such as are weaker, and not only overtop them, but also deprive them of that nourishment which they so much require: as the bedge advances in age the evil becomes graner; small sutured plants, and innumerable gaps appearing throughout the whole line of the finee; there are interspersed with others remarkable for their strength and luxurainee; the whole conveying to the mind not the most distant idea of utility. The worst part of it is, that, when hedges have been thus neglected in the beginning, no pains nor industry on the part of the farmer, will be sufficient to render them useful afterwards; there being nothing more difficult than that of repairing the defects of a bedge, after the third or fourth year of its growth.

This assorting of hedge plants has a farther advantage: namely, that of putting it in the power of the person who plants the hedge, to put down the large, strong, healthy plants upon the poorest part of the line of the fence, and to set such as are smaller and weaker upon the richer and more fertile parts. He has it also in his power by a more careful preparation of the soil, and bestowing a greater proportion of manure upon the spaces where the small plants are set, to give them that nourishment and assistance which they require, and which would very soon enable them to form a fence, equal to that part occupied by the strongest plants. In an after part of this Paper, more will be said upon this subject; at present it is only necessary to state, that in every case, it is desirable to have the plants of which a hedge is made, as nearly as possible of one size and strength; but as there is little probability of meeting with a sufficient number of plants of that description, to complete a hedge of any considerable extent, much advantage will arise from assorting the plants properly, and placing the strongest and most healthy, upon the weakest and worst parts of the line of fence, and the smallest and weakest in the spaces where the soil is of a better quality, and contains nourishment sufficient to raise them to an equality with the stronger and larger ones.

Dressing and Pruning of Hedge Plants before they are put into the Earth,—
There is perhaps no part of the system of managing either hedge plants, or forest
trees, before they are planted, more hursful and defective than that now pursued in the
common nurseries.

It is a very common practice with nurserymen in the spring, when they wish to clear their ground for other purposes, to take up great quantities of thorns and other hedge

plants; and after pruning the tops, and cutting off nearly the whole of the roots, to tie them up in hundles, and lay these bundles in heaps till they are called for. In that mutilated state they often remain for many weeks, with the mangled roots naked and unprotected, exposed to every inclemency of the weather, before they are sold. The consequence is obvious; the severe pruning by curtailing the number of the roots. and depriving the plants of the means of drawing their nourishment from the earth. would of itself prove an effectual check to their future growth, even if they were planted immediately after this severe trimming; hy being allowed to remain so long exposed to the weather, afterwards, the tender fibrous extremities of the remaining roots are most of them destroyed, and when the plants are afterwards put to use, they are not only half dead, by being so long above ground, but are as it were insulated, and their connection with the earth cut off by the pruning and destruction of their roots. Under these unfavourable circumstances, they must remain in the ground till new roots are produced, during which period they suffer a total want of nourishment; and if the soil is dry, and much warm dry weather follows the planting of the hedge, many of the plants will perish, before they are capable of pushing out, and producing a number of new roots sufficient for their support; accordingly, many of them fail from these causes; and numbers of hedges, which, under different management and with small trouble, would soon have been complete fences, are full of gaps, and remain for ever after in an imperfect state.

When thoms or other hedge plants are thus severely handled, and their roots and tops so unmercifully cut off, they resemble cuttings more than plants, and must remain a very long time in the earth, before they are capable of sending out new roots, or drawing from it a quantity of nourishment adequate to their support.

Were nurseymen and others to bestow the smallest attention upon the subject, common neare would dictate a very opoposite treatment. Men of observation know, that in every instance where either trees, or herbaceous plants are to be transplanted, the more carefully they are taken out of the ground, the more numerous and entire their roots, and the sooner they are again put into the earth, the less check will they receive, and the quicker and stronger will they afterwards grow. If these observations are just, how faulty and defective must the system we have just now described appear. Indeed, nothing can be more repugnant to nature and common tense, than to suppose, that when plants of any description, are removed from the situation in which they are growing, and sent to such a new catabilisment in a different soil, in which they are growing, and sent to such a new catabilisment in a different soil.

and perhaps a worse climate, they will thrive better by having their roots cut off, and being almost entirely bereft of the means of obtaining nourishment. With equal probability might success be expected, from planting a colony with people, after having completely mutilated them, by cutting off their hands, putting out their eves, &c. &c.

In place of this treatment, the defects of which are so obvious, and the consequences resulting from its obstriller, io no being plants should be lifed out of the nursery ground, till the day on which they are to be replanted; and instead of digging them with a spade, by which they are often much injured, they should be taken up with dang forks, with strong round pronsg, taking care to disengage the roots carefully from the soil; and in place of the severe pruning and dressing already mentioned, every root, even to the smallest fibre, should be carefully preserved, and the use of the knife confined entirely to the necessary curtailing of the tops. Where this care is taken, and the plants put into the ground at a proper season, they will suffer no kind of check, and when the spring arrives grow luvariantly.

Weeding and Hoeing of Hedges, &c .- Much of the benefit arising from an attention to the foregoing circumstances, will depend upon the after management of the hedge, Complete weeding, loosening, and laying new earth to the roots, for the first three or four years, are indispensable requisites; for whatever pains may have been previously taken in dunging, and summer fallowing the soil, unless it is properly attended to, and kept clean afterwards, this dunging and summer fallow, in place of being useful, will prove hurtful to the fence; as the manure and tillage, by enriching and opening the soil, will encourage and promote the growth of weeds; which under circumstances so peculiarly fortunate, will become so luxuriant, as either to destroy or materially injure the growth of the hedge, unless they are kept down by frequent and complete cleanings. These weedings are of two kinds, and ought to be conducted in two different ways.-If the weeds are principally annuals, a slight scuffle with a hoe will be perfectly sufficient; and this to be repeated as often as a new crop of weeds appears: but when the weeds in place of annuals are composed of root weeds, or in other words, of perennial, or biennial plants, the extirpation of these last will be attended with more trouble. With weeds of this description seuffling will not answer, as though the tops may be cut off by that operation, the roots remain, and not only furnish repeated erops of the same weeds, but also rob the hedge of its proper nourishment. In place, therefore, of scuffling and cutting off the tops of such weeds with a love, the ground ought to be carefully dug with a dung fork, of the kind already described for lifting thorns; an instrument of this zon't is perferable to a space, as it cuts none of the roots of the hedge, toosens the ground sufficiently, and at the same time admits of the weeds being readily and easily picked out. The first weeding of this kind that it given to a young hedge should be early in the spring, when, if it is completely done, there will be little occasion for any farther trouble during the seaton; cleaning at that period has a farther advantage, namely, that of loosening the soils at the exact time when the roots are beginning to spread and extend themselves. Whereas, when it is delayed till the summer, the weeds have attained a considerable size, have deprived the hedge of much nourishment, and the opening of the soil then exposes the roots of the bedge to the parthing heat of a summer sun.

In the cleaning of young hedges, especially such as are aisused in the face of a ditch or bank, it is the universal custom for the abbourer to skim off the surface with a spade, and let it fall into the bottom of the ditch. This operation, though it gives the hedge an appearance of cleanners, is attended with some very considerable disadvantages: repeated parings of that kind in the face of a ditch or bank, in a few years waste the front so much as in some degree to undermine the hedge, which after frost or wet weather is apt to silide and numble down; the paring off and throwing into the bottom of the ditch so much earth, together with the roots and weeds it contains, very soon chokes and fills it up.

When ditch and hedge comes to be mentioned, notice will be taken of the necessity of constructing that fince is such a way, as that the bedge shall not project immediately from the front; but shall be placed upon a shelf, or what is termed a scarcement, of not less than twelve or fourteen inches broad. By such management the hedge will run nor risk whatever of being undermined, by the earth falling into the ditch, and may be kept clean with as much ease as a common garden border. The proper method of eleaning a bedge planted in this manner, scenus to be, that of digging the border with a short pronged fork in the spring, picking out such of the weeds as can be readily taken up by the hand, and afterwards raking it with a garden rake; this last operation, along with its making the surface smooth, and giving the work a finished look, will also bring out a great number of the smallest roots that had escaped the labourer's notice in digging it with the fork.

Some imagine that, by a slight weeding once or twice a year, for the first two or three years after the hedge is planted, they do all that is requisite; this, however, is a mistake; for though a hedge may, by care and attention for the first five years of its growth, anian such a height, as will prevent it from being smothered by the weeds, still it will suffer much injury from them, not simply by the nourishment they take from the hedge, though that must be considerable, but by the effect they have upon the lateral branches near the root, many of which they kill, and by that means render the fence open and nacked at the bottom. Skild hedgers are well acquainted with this circumstance, and very properly consider annual cleanings, and loosening the soil about the roots, as equally necessary to the welfare of the hedge, as the other operations of switchine, pruning, &c. &c. &c.

The apparent trouble and expence of cleaning every description of hedges yearly, will no doubt present a formidable obstacle to the practice; but when properly considered, this labour and expence will be found more apparent than real. For if a proper weeding has been given, when the hedge was first planted, and the earth well opened, the only trouble required afterwards, will consist in giving the ground on each side of the hedge, a slight scuffle with a hoe, a work at which a labourer will be able to do a very great deal in the course of a day. To this practice of keeping hedges clean, with a view to promote their growth, is to be added another motive of equal, indeed of superior moment:-round most of the inclosed fields in Britain, the space occupied by the fence is considerable, and as no part of this space is under the plough, it is left to produce such plants as nature or accident may have brought into the soil: these, by being suffered to grow, and their seeds ripen yearly, are wafted by the wind into the adjoining fields: where they multiply beyond conception, and create an endless trouble to the occupier, rendering abortive a great part of the labour and expense incurred in fallowing. A person who is sensible of the advantage arising from the extirpation of weeds of every description, either in the fields, or their immediate vicinity, must feel a considerable degree of pain, to observe, about the end of summer. clouds of the winged, or bearded kinds rising from the side of every hedge or highway. with the slightest breeze of wind, and scattering themselves over the adjoining fields. which have been perhaps fallowed the year before, at a heavy expence: the evil is undoubtedly great, and affects the innocent as well as the guilty; it being no uncommon thing for the best farmers to have their fields rendered foul, by the wind blowing the weeds of their slothful dirty neighbours upon them. The remedy is easy; let every farmer be obliged to cut down the weeds round the whole line of his fences, so early in the season as to prevent them from running to seed; and let the trustees in every county, in making contracts for the repair of the public roads, bind the contractor to cut down the weeds annually. The labour of these operations will be very trifling, their benefit to the public immense,

In loosening the earth about the roots of hedges, whether old or young, it will be of advantage, if there is soil enough to admit of it, to lay up a few inches of it to the roots; doing this frequently, encourages them to push out branches near the bottom, which prevent them from growing thin and open, a fault to which almost all hedges are liable, if the gains are not taken to prevent it.

When a hedge has been planted in the face of a ditch, bank, or mound, with a projecting space or scarcement before it, of sufficient breadth, a supply of new earth may be laid up to the roots every two or three years, from the sediment let fall by the water in the bottom of the ditch; this sediment is in general the richest of all soils, and as it is necessary to remove it from the bottom of the ditch, for the purpose of cleaning the water-course, employing it in this way, not only saves the trouble of carrying it elsewhere, but promotes the growth of the hedge, and gives the fence a much more finished look. Upon the sides of highways, the same thing may be done with advantage not only to the hedge, but the road also: for though there may be no ditch to require eleaning, yet as most of the highways in Britain, have a greater or less declivity towards the sides, the decayed materials of which the road is made, together with the horse dung, and other matters dropt upon it, are washed down from the top to the sides, where it accumulates in considerable quantities; shovelling this carefully up, and laying it to the roots of the hedge, affords the plants at once protection and nourishment. Where hedges are planted upon the plane surface, the earth can be laid up to the roots with great ease; and at each cleaning, it certainly should be done, the trouble of doing so is trifling, the advantage considerable.

Pruning, and after Management of Hedges.—Though a strict attention to the foregoing circumstances, during the inflatory of a hedge, is highly necessary to produce healthy, vigorous plants, a very considerable part of its beauty and future value will depend upon the pruning and after management that is bestowed upon it.

There is, perhaps, no part of the subject upon which a greater contrariety of opinion as present prevails, than the age at which the pruning of hedges ought to commence, the manner of that pruning, or the season of the year, at which it may be given with the greatest possible advantages, and the least risk; the practice with some its to prune from the first year, not only the lateral branches, but the tops also, and give, as a

reason, that cutting off the extremities of the shoots contributes to the thickening of the hedge, by making them push out a great number of new ones. The fallacy of this argument, and the mischelf with which the practice is attended, we shall elsewhere have occasion to notice. As to the manner of pruning, or the form of the bedge, these seem, with many, to be matters of infidirence, no stendino being paid to dressing them in such a way as to have them broad at bottom, and not a great part of them being not only of one within from top to bottom, and not a few much heavier and broader above than they are below; it is obvious that such hedges can neither look well, nor be useful. The season as which they are trimmed is, in many instances, an impoper one, for in place of choosing that time when the plants are less in danger of suffering from an effusion of their juices, which is either at a late period in the autumn, or very early in the spring, the gruning is given in the summer season, when vegetation is in its prine, and the plants are fall off juices; it he check and injury they must receive from having the whole of their extremities cut off at that period, may well be conceived.

In speaking of the treatment of hedge plants before they are put into the ground. notice has been taken of the necessity of preserving the roots as much as possible, and at the same time shortening the tops: this last operation has two good effects; for by curtailing the top and branches, the roots have less to nourish; and by leaving only two or three inches of the top above ground, in place of growing up with a single stem, it sends out two or three; and as these strike out from the plant so near the earth, each of them has the same effect, and strengthens the hedge as much as the original stem would have done by itself, with this addition, that in place of one prop or support, the hedge will have three or four. After this first pruning, however, no hedge should be touched, or at least very gently, for some years; from an inattention to this circumstance, and the injudicious application of the knife or shears, at an early period, many young hedges are rendered useless, which, under different treatment, would have made excellent fences, with one half the trouble that was required to destroy them. The practice of cutting over the tops yearly, which is done with a view to render the hedge thicker and more perfect, is one of these mistakes which we would naturally have supposed common sense and observation would have sooner corrected; the effect produced being, in almost every instance, the very reverse of what was intended: shortening the main stem of a thorn or any other plant, makes it brush out a number of small stems immediately at the place where it has been cut; and if this operation is repeated

once or twice a year, every one of these is again subdivided, as it were, by sending out more branches; thus, in a course of years, during which, the hedge makes very small progress upwards, if it be examined, instead of being found to consist of strong vigorous plants, with a good main trunk, each reaching from top to bottom of the bedge, and a sufficient number of lateral branches throughout the whole length of it, it will be found, by such repeated cuttings, in the same stutted situation as certain young trees and shrubs, this are frequently cropped by sheep or cattle. From the repeated crops of young shoots, which the tops send out after every dipping, and the great quantity of nourithment necessary to support such additional numbers, the lateral shoots at the bostom, upon the strength and numbers of which the value of the hedge; in great a measure depends, are stituted in their growth, and soon die; the hedge, of course, becomes open and naked at the bostom, and consequently suches as a force. Where a hedge has been thus truined, there is no remedy but cutting it over, close by the ground; this will immediately produce a number of healthy, vigorous, spright stems, which, under proper managements. Will soon form a sood fince.

From the first year of planting, till the hedge has risen to the height of five or six feet, the main stems ought to be left untouched, and the pruning confined solely to the side branches, leaving those next the root pretty long, and gradually tapering towards the top: this pruning of the side branches will make them send out many new shoots from their extremities, which, by repeated trimmines, will become so thick as to fill up every interstice from top to bottom of the hedge, while the main stems, by being left untouched, continue their growth upward, till they arrive at the necessary height: when they may have their extremities cut off with perfect safety. When a hedge has attained the wished for height, all that is requisite afterwards, is regular switchings with a hedge-bill, preserving it pretty broad at hottom, and drawing it gradually to a point at top; this form of a hedge is pleasant to the eye, is well calculated to stand the weather, and by being thus above the nourishment that would have been wasted in supporting a thick, bushy, overgrown too, is retained by the branches at the bottom, which are thereby strengthened, and their numbers considerably increased; while the trunk, by having no more exertion to make in an upward direction, becomes every year stronger and thicker. A hedge of this sort in full leaf has the appearance of a solid wall; and when viewed after the leaves are shed, presents to the eye a set of massy growing piles, so strong and formidable, as to bid defiance to any attempts that may be made to break through them. Plate IV. fig. 20, represents a hedge trimmed in this way.

Catting down old Hidges.—The above directions and observations apply with artice propriety only to such hedges, as have been regularly attended to from the time of their being planted; but as there are innumerable hedges in the kingdom which being neglected, have grown up to a great hedge, have become open and naked below, and bushy and unmanageable at too, it is of consequence to point out the mean of reducing such hedges to a moderate scale, and rendering them useful. This purpose can only be effected by cutting them down, and proving from their sumps a growth of new shoots, which, with proper management, will soon make a perfect fence. If the fields inclosed by such hedges are alternately in pasture and tillage, the period most proper for cutting them down, is when the field is to be ploughed. Under a corn crop, the confinencent of the stock is no longer an object; and by the time the field is again brought under the plough, the hedge, if properly treated, will have acquired strength enough to become a good fence.

This operation is performed in several different ways; in the first, the hedge is cut over, about a yard above the surface, and is left in that state vision any other pains being taken with it; if it has originally been good, and the plants thick enough at borton, this kind of cutning will answer the purpose perfectly well, and in a few years the hedge will, with proper dressing, become both a next and a useful finee. Plate 1V.

fig. 30, represents a hedge cut over in this way, with one year's growth of new shoots upon it.

When there has been a deficiency of plants, and the hedge is tout over in the manner above mentioned, innumerable gaps will appear, which, without some art, it will be impossible to fill up. It has also this farther disadvantage, that if either horses or cattle attempt to leap inco, or out of, the inclosure, the sharp points of the stakes are apt to run into their belly: this accordingly often happens, and many valuable horses and cattle are killed in that way.

The second, and indeed a preferable mode of cutting down old hedges, is to cut a fourth part of the plants over, to the height which the fence is intended to be made, and to bend down and warp the remaining three-fourths with these upright stems. Plate IV. fig. 31, represents a hedge done in this way, which very effectually cuter the gaps and openness below, and with alight startinion soon makes a good fence.

The third way of cutting over old hedges, is to cut them close by the surface; this practice, when the plants are numerous, and there are no gaps in the hedge, answers very well; but when there is a deficiency of plants in any part of the hedge, the want

will be very apparent. This last mode, though much inferior to the one immediately preceding, is nevertheless greatly preferable to that first described, as the young shoots sent out from the stumps, by being so near the ground, will in some measure remedy the defects occasioned by the want of original plants; whereas, when the old plants are cut at the distance of about a yard, or four feet above the surface, the young shoots produced by the cutting will be so high, as to leave the heldge opin below.

The law way of cutting down old hedges, and which, by the by, is but very little practised, is first to cut them down even with the surface, and afterwards to cover the stumps completely over, with the earth taken out of the dicth, or from the way ide. When this is carefully done, every single root sends out a great number of young, vigorous shoots, which, by branching out from the stump below the surface, each of them sends out troots, and acquires an establishment for itself; by that means the bottom of the bedge becomes so thick, that neither sheep, eattle, nor indeed any animal, can find its way through it.

In whichever of these ways the hedge is cut down, the directions formerly given for the management of young hedges, should be strictly attended to, as soon as the young aboots have made some progress; that is, the side branches should be trimmed, and the hedge put into a proper shape, preserving it broad and full at boutom, and tapering gradually towards the top. The same cuation is also to be observed with regard to the upright shoots, none of which should be shortened till the hedge has attained the wished for height. It is surprising what close beautiful fences are raised, in this way, in a few years from the stumps of some overgrown useless hedges; which, at the same time, with their being naked below, and of course faulty as fences, occupied four times the space they ought to have done, to the great loss both of the proprietor and farmer.

The observations formerly made, with regard to the proper season for pruning and switching young hedges, apply with equal, indeed greater propriety to the cutting down of old ones; as, if this operation is done at an improper season, from the largeness of the stumps, the extent of wounded surface exposed to the weather, and other circumstances, the plants are in immissionet danger of being decroyed: included this very often happens when, through ignorance or instruction, the proprietors of bedges bave them plashed or cut over during summers. It is unnecessary in this place to eater into any digression as to the use of leaves and branches, no plants of every description; it is sufficient for the present purpose, to state what experience and common sense have abundantly proved; irr. that the loss of either, expecially when the plants are in a

growing state, and the juices circulating through them, is in most cases attended with the destruction of the plant; indeed the thing speaks for itself; the juices of the plant, instead of being employed in outsiling the top and branches, flows in great abundance through the section of the trunk, and by finding so ready an exit, draws from the troot a quantity of nourishment, far exceeding the proportion required for its former support: by such an unusual drain, the plants are exhausted, or, as is commonly said, they bleed to dealb. It is to be observed, however, that every description of plants, are not equally affected by a summer cutting; those that are most juicy and succulent, and have the largest circulating vessels, always suffering more, than such as are of a harder texture, have smaller prore, and less sape irectualing through them. The birts, larch, poplar, willow, and in general all plants that contain a large proportion either of trainous or succharine matter, are to be ranked in the first class; the different kinds of thour, reads, &c. &c. he-long to the second; the former are almost infallibly killed by a spring or summer pruning, while the same operation is often practiced upon the latter with title dapparent injury.

But though we thus readily admit, that one description of plants will survive an operation, by which others would be killed, it by no means follows, that they are not injured thereby; there are, indeed, too many proofs to the contrary, as in almost every county there are thorn hedges met with, that have been plashed or cut over in summer, and which, though they have not did in consequence of the operation, yet by the loss of juices, and the exposure of their naked trunks, and wounded extremities, to the parching rays of a summer sun, have been so much weakened as to prevent them from putting out new shoots, and have ever afterwards remained in a naked state, exhibiting an appearance no way better than that of a dead hedge. This picture is the very reverse of what, under different treatment, would have been the ease; as, when the old plants are out over at a proper season, a healthy luxuriant crop of young shoots never fails to be produced.

The proper season for cutting over hedges is either at a late period in the autumn, or very early in the spring; at both of these periods the plants are capually safe from in-jury; at the former, the juices are retiring towards the root, and early in the spring they have not begun to rise. In either case, no danger whatever ean arise from the bleeding of the plants, as, long before the circulation takes place, the wounds occasioned by the cutting will be completely healed; all cuttings or trimmings ought therefore to be done at one or other of these easons.

Filling up Gaps in Hedges.-When young hedges are planted, if the plants made use of are of a nature suited to the soil, the hedge may be kept free of gaps with very little trouble: for that purpose it is necessary, about the end of the first autumn after the hedge has been planted, to examine it carefully throughout its whole extent, take out such plants as are either in a decayed sickly state, and those that are actually dead, and fill up the spaces they occupied with the strongest and most vigorous ones that can be found; where this care is taken for the first two or three years, there will be no defects in the hedge, which will be uniformly thick and strong throughout. Thus far, of young hedges: but when old hedges are meant to be cut down, that have many gaps or open spaces in them, so wide as to prevent the possibility of the young shoots filling them up, some expedient must be had recourse to, in order to render the fence complete. This purpose may be answered in different ways; the easiest, and indeed the most common method is, for the hedger, when he comes to a place where any of the plants are wanting, to take one of the strongest plants next to it, and after giving it a gentle stroke with the hedge-bill, to bend it aeross the opening, and entwine it with the thorns on the opposite side; indeed, as has been already stated, some have a custom of cutting down only a fourth part of the stems, and warping the remainder with these, which appear like stakes drove into the earth. Where the hedge is shortened to within three or four feet of the ground, both of these answer presty well; and the openings, which would otherwise have been left, in some degree filled up: but when the old hedge is cut close to the earth, other methods of supplying the defects become necessary. One very simple, and at the same time very effectual mode, consists in first digging the ground pretty deep with a spade, and taking one of the strongest plants on each side of the opening, that have been purposely left uncut, removing the earth from their roots so much as to loosen them, and admit of their being bent down, and laid close to the earth in the opening, as represented in Plate III. fig. 24; they should then be fasteneddown with wooden hooks or pins, and entirely covered throughout the whole of their length with earth. Where this is properly executed, the plants so laid down, send up a great number of young shoots, which very soon fill up the vacancy: where it is practised upon a hedge that is cut over close by the surface, no other care is requisite; but when it is done with hedges, that are cut at three or four feet above it, there will be a necessity for placing a temporary paling in the gap, to project the young shoots from injury, till they acquire a sufficient degree of strength, as represented in Pl. IV. fig. 25.

There is scarce any thing attempted by farmers, in which they are so unsuccessful, as in the mending of hedger; in some cause the defect is attempted to be supplied with young plants, which from want of attention very seldom succeed, at they are not only shaded by the strong old plants on each side, but are also deprived of their nourishment, by their roots spreading into the vacant space.

To render an attempt to mend the defects of an old hedge, with young plants, successful, two things are absolutely necessary; the first is, that the whole of the roots of the old plants, which extend themselves into the opening, shall be entirely cut off; the next, that the hedge shall be cut down close to the earth, for at least a yard or more on each side of it. By cutting away the roots which extend themselves into the opening, the young plants are prevented from being robbed of their nourishment; and cutting down the old ones, for a little distance on each side, keeps them from being shaded, and allows them to enjoy the full benefit of the light and air; cutting down so much of the old bedge, no doubt, renders the opening larger, and of course requires more paint go supply the defect; but this extra expence will be more than comensuated by the suscess with which it will be attended.

In many instances these vacancies are filled up with dead wood; indeed it is a common practice after a hedge is dressed, to cram the greatest part of the prunings into these spaces, and under the bottom of the hedge, where it is any way open or naked. The most perverse imagination could hardly suppose any thing more absurd: for if it is the wish of the owner, that the plants on each side, should send out new branches to fill up the openings, the purpose is completely defeated by cramming them full of dead brush-wood, which not only prevents the extension of the branches, but from the violence and injury that is committed in thrusting in dead thorns, the plants are often materially hurt; and when this brush-wood decays, the opening, in place of being diminished, is considerably enlarged; the mischief is the same, where they are thrust under the bedge, the practice of which when continued never fails to render it naked at bottom. The use of stones (represented in Pl. IV. fig. 27.) for mending the hedges, is equally absurd and pernicious; where dead wood is used in the way above mentioned, the hedge instead of being improved is made worse. The utmost that can be said of stones is, that though they do no additional harm, the hedge is not bettered by them, and from the opening heing filled up in that way, the defect is perpetuated, and both the usefulness and beauty of the fence impaired.

In some instances where the attempt bas been made, the defects of grown up

hedges have been very completely, and indeed almost immediately repaired, by planing strong beeches in the openings: these should be as level six or seven feet in height, and should be supported by a couple of pieces of coarse paling, prt across the opening. If planted early in the winter, they suffer no check whatever, and grow so vigorously in the spring, as to fill up the vacancy she first season, (see Pl. IV. fig. 26.)

The ground in this, as indeed in every other case where young plants are used, should be well dug, and enriched either with dung or compost; the plants should be the healthiest and strongest that can be procured, and the whole of their roots carefully preserved.

Dissace of Hedge Plant.—The principal disease to which hedge plants, especially thorm, are liable, is being covered with most; which, when it arrives at any considerable height, gradually destroys them. Upon certain soils such as till, or cold wet clay, every description of weody plants are subject to this malady, and as it is evidently owing to the nature of the soil, it becomes a matter of importance to be able to apply a proper remedy.

Lime is well known to be unfriendly to the growth of every description of moss, and in every instance where it is applied the most disappears. This circumstance once known, furnishes a cheap and effectual remedy, both for preventing the disease upon young hedges, and curing it upon such as are grown up.

If the linits formerly thrown out, with regard to the preparation of the soil before a young hedge in planted, are properly attended to, and a sufficient quantity of line incorporated with the earth; let the former quality of the soil be what it may, its nature will be so much altered, as effectually to secure the hedge from every risk of being lunt by moss.

The same remedy may be applied with equal success to old hedges, that are overrun with this vegetable vermin: and in which, though there may be plants enough in the ground, yet they are of no value, from the want of branches. To recover such hedges, and render them afterwards good fences, they should be cut down close by the surface, cleared completely of weeds, and the earth well dug, for at least half a yard on each side of the roots. After this operation, which should be done about the end of autumn, the spaces so dug should be well limed upon the surface, it should be suffered to remain in that state during the winter, and early in the spring dug again, and the lime pointed in and incorporated with the soil. In the eases where this last been done, the plants have sent out a number of useful vigorous shoots, which soon made good bedges, and no most has afterwards apparend. It is from these experiments to be presumed, and we hope experience will confirm the idea, that in every case where either trees or bedge plants are infinited with most, the use of lime in the way pointed out, will prove a sufficient remedy for the evil.

Before quitting the subject of hedges, we beg leave to mention the practice of many of the English counties, where it is common, after the plans have tathend the wheld for height, to cut their stems about half through, within a few inches of the bottom; then bend them a little down, all in one direction, and bind them together at top with willows, as represented in (F. IV. Vf., gs. 32). This, when properly executed, forms a very pretty neat looking fence, but is liable to several objections. In cutting the plants so near the root, unless great pains are taken, there is a chance of cutting them too much, indeed in some instances they are cut through altogether; the value of the bedge is by that means lessened, and gaps appear in many parts of it.—The, binding at top being of dead wood soon decays, and the plans either ite up, if they have not been very much cut, or if the cutting has been deep, they are apt to be blown to one side, and even broke over by the wind. Owing to these causes, many hedges where the plants are sufficiently numerous and healthy, and which with little trouble would have formed beautiful and useful fences in a short time, have their value impatiend, and are rendered faulty and defective.

Cutting the stems too much, subjects them to another evil; namely, the mischief arising from heavy falls of snow, which when the quantity is considerable, especially if there is a high wind to accumulate it about the hedge, it is thereby pressed down, and many of the plants broke entirely over.

The practice formerly noticed of cutting one-third of the stems over, as the height of about four feet from the surface, leaving those as standards, and warping them with the others that have been left of the full length, makes a much stronger fence, and one that is less liable to injury, either from the attempts of cattle, or from the wind, or heavy falls of snow. What adds to his value is, that the warping and binding of the busher being done with live wood, in place of decaying, as is the case when willows or hazels are made use of, grows stronger with time, and the plants are in the end so completely intervoven, as to form a fence which nothing can exceed, either for closeness or drarbility.

The way in which this operation is commonly done, is liable to one objection,

however, it being customary to trim away the whole of the branches, before the stems are bent down; this renders it no doubt a much easier business for the workman; but it materially injures the hedge, leaves it thin and open in many places, and gives it not only an unpleasant appearance to the eye, but makes it less useful as a fence. This defect is not in general repaired for a year or two; whereas, by leaving as many of the side shoots as possible, upon that part of the plants thus are to be laid horizontal, and, after the whole hedge is warped, trimming it neatly with a hedge-bill, it will form at once a solid and useful fence. Pl. IV. fig. 30, and 31, represent hedges done in this way.

It should never be forgot, that in every operation of this kind, when old hedges are either cut over, or bent down, the ground on eachs hid should, as soon as elcum-sances will admix of it, be completely dug, cleared of weeds, and the earth laid up to the roots of the plants. It is truly surprising what numerous, and luxuriant aboots the sumps and our, when managed in this way. While, on the contrary, when these necessary operations are neglected, fewer aboots proceed from the old trunks, and of these few a considerable proportion are choiced by the weeds.

## Hedge Plants,

Throughout the Island, almost every description of plants, whether trees or shrubs, are made use of for hedges; in some cases the hedge is made entirely of one kind of plants, in others of two or more; and in not a few instances, it constituted a mixture of all the different kinds. The following list comprehends those that are principally used for that purpose.

10. Larch.

2. Black ditto.	11. Hazel.
3. Crabs.	12. Privete.
4. Briars.	13. Allar, or alder.
5. Holly.	14. Elder.

t. White thorns.

6. Beech. 15. Whins, or furze.
7. Willow. 16. Brambles.
8. Birch. 17. The mulberry.

9. Poplar. 18. Miscellaneous articles.

It has been observed, that a hedge is sometimes composed of one kind of plants only, and sometimes of a mixture of different kinds. The inconvenience of mixing different plants in the same hedge is very obvisus; shrubs, or trees of different kinds, if put into the same hedge, neither grow equally, n or are in leaf at the same time; by this means both the appearance, and usefulness of the hedge is hurt. It is disgraceful to observe the mostley mixture of plants, that are crammed into many of the hedges in England; epecially that description known by the name of Hedge-and-bank. This seems to be the olders kind of inclosure known in England, and is beyond dispute the worst. The plants employed, are commonly a mixture of hazel, elder, sweet-briar, honeysuckle, &e., t these from their nature, most of them wanting prickles, and growing so unequally, are ill calculated cither to confine the anock while the field is in pasture, or proceet the crop from liptry, when it is under the plough. This disadvantage both proprietors and farmers are sensible of; but though the remedy is easy, yet so induction are they, and so much wedded to old customs, that it is almost impossible to simulate them to any exerction.

In those counties where this kind of fence is so common, these high banks of earth might be converted into a valuable and lasting source of improvement for the fields which they surround; good earth of every kind is known to act as a manure, especially if it has been any time raised above the common surface, in the form of banks or mudwall; perhaps in most of the fields inclosed in this way, a quantity of valuable earth might be procured, sufficient to cover the whole surface to a considerable depth; and a better fence raised upon the foundation, in a few years. These fences should consist entirely of one species of plants, unless where a few willows, or hazels are wanted to bind the hedge together. Having enumerated the plants at present in use, we proceed to take some notice of each separately.

White Thorn.—White thorns, or quicks, as they are commonly called, are rearred with great case, and under proper management soon make useful and handsome fences upon all dry soils, provided the situation is not too high and exposed. In such places, though the plants do not perish entirely, they never attain the strength or vigour necessary to make a sood fence.

In cases where the natural surface of the ground is rather too moist for white thorn, the excess
of damp may be carried off by a ditch on one side of the plants in the usual way.

In marshy situations where a ditch on one side would be insufficient to lay the soil dry enough for the success of white thorns, it ought to have a drain on each side of the bank on which the thorns grow, and which would be particularly favourable for the growth of ash poles.

In every case where thorns are planted upon the common surface without a ditch, and upon dry ground that has been previously prepared by dung, llims, &cc. they grow better than where ditches are used; because, as was formerly observed, the ditches serve as open drains to carry off the moisture, a circumstance which in dry seasons is often very detrimental to the growth of the hedge.

Except weeding, the thorns should not be touched for the first four or five years of their growth, unless it be to crop the most luxuriant of the lateral shoots; as the end of that time they should be completely trimmed, and put into shape, leaving the top shocts untouched, till the hedge attains the necessary height; when this stem ought also to be cut over, and its farther growth upwards prevented by regular yearly cuttings. This treatment, and its good effects, have been already so fully and particularly described, as to render any addition to what is here said unnecessary.

Black Therm, Crabs, Briars, &c.—These plants should be treated in nearly the same manner as the white thorn. There is, however, one remarkable difference between them, which is, that both the crabs and black thorns will thrive, and become good fences, in situations where the white thorn would perish: upon tills, and cold clays, for example, many fields of that description are completely induced with them, which could never have been rendered fencible; if white thorns had been employed.

Helly:—'The holly, when properly attended to, forms a thick and beautiful fence, and has an advantage over most others, in affording the same degree of shelter at all seasons. It grows well upon all soils, but particularly upon deep and moderately dry loams. Its progress is, however, slow even in the most fortunate situations, which renders it unfit for common use; unless in pleasure grounds, or places where taste or fancy require it.

Becb.—Hedges ende with this plant have not hitherto been very common; they are, however, fast coming into use, and perhaps will soon be the only kind employed in the uplands, or upon the cold wet soils in the lower districts of the kingdom; for these situations, so far as the experience of several parts of Scotland can ascertain that point, they are remarkably adapted.

In East Lothian there are several tracts of land, the soil of which is of a very inferior quality, that have had their value greatly increased, by inclosing them with beech hedges, upon which thorus were formerly tried without success, and much trouble and expence incurred in the attempt; while the beeches, which originally cost no more than the thoms, without any trouble very soon become good fences. Along with their growing so readily in these unfavourable situations, they possess a property well astied to a cold or exposed country; a manely, that of preserving their leaves through the winter, and indeed till an advanced period in the spring; by which they afford shelter to the grazing stock, and also to the pasture in the early part of the season, when it is apt to be hurt by the cold nipping frost winds.

Birch.—The birch is peculiarly adapted to cold clays, \* where is addom fails to thrive, and form a good fence; some caution, however, is necessary as to the management of it. In all cases where it is intended to cut or plash it, the operation should be done about the end of autumn, as the juices are at that time retiring to the root, and long befort the circulation is again renewed, the wounds are healed: whereas, when the cutting is deferred till the spring, or beginning of summer, when the circulation is going on, the juices flow out by the wound, and continue to run off in that way during the whole of summer; by which means the plants are so weakened and exhausted, that many of them die: a misfortune which is entirely prevented by cutting about the end of autumn, or during the winer.

Willowa, Poplara.—Upon all wet or marshy grounds, these plants thrive and are extremely useful, in completing inclosures in many situations, where other plants would either perish entirely, or remain in a dwarf stinted state. In Huntingdonshire and several of the fenny parts of England, these plants, in conjunction with the alder, form almost the only description of live fences that are met with: their value in these parts is well known, and in every similar situation throughout the kingdom, if proper trials were made, they would be found equally useful. Hedges made with willows, have an advantage over almost every other, as, after the hedge has arrived at a certain height, and is properly laid down and bound together, the young shoots may be annually taken off, and sold to basker makers for a considerable unso of money. They have another obvious advantage, viz. the ease with which they are propagated; being raised from simple cuttings, without any other trouble, than that of merely atteking them into the earth. Where this is practised, and in most situations it may be done with great ease, the farmer or proprietor will not only have his fields inclosed, but the fence will be converted into a source of revenue, by the sile of the young abouts yearly.

Where the Huntingdon willow is used, a farther emolument may arise to the proprietor, by allowing a certain proportion of the plants to run up into trees; with very

<sup>.</sup> It is the only plant which succeeds in the sandy rabbit warrens of St. Leonard's forest, Sussex.

little eare they soon arrive at a great size, and are of considerable value; the wood is soft, easily wrought into any form, takes a fine polish, and can be tained of any colour. These qualities render it a great acquisition to cabinet-makers and others, in the making of fancy articles; its introduction in these branches, would in a great measure set aside the use of sain wood, and several other kinds brought from the Spanish Main, and the East Indies, which at present cost a great deal of money, and are in no respect preferable to the Huntingson willow.

The use of willows, poplars, &c. is not confined solely to wet or marshy grounds, they thrive upon almost every soil; and, indeed, make more progress upon such as are moderately dry, than upon wet lands; upon the latter, however, they grow better than any other plant, and on that account deserve a preference.

There is one circumstance connected with the use of willows and alders, that deservers particular notice. Both of these plants contain a very great proportion of saccharine matter, which under proper management might be converted to some useful purpose. In speaking of the birch, the same circumstance ought to have been noticed, as that plant also abound with saccharine jutices: from all these plants we have been able to produce fermented liquors of a good quality, and even to distil spirits. Trials diligently made upon them by persons of skill, may perhaps lead to very important consequences, and be the means of lessening the dependance of Great Britain upon the West Indies, for some of the productions brought from that quarter,

Hazel, Elder, &c.—These plants grow well upon all dry soils, and if properly managed by laying, wattling, &c. produce wood enough to form a very sufficient fence; but their want of prickles renders them less eligible than thorns.\*

Where the proprietor is disposed to take the necessary trouble, the hazel may be rendered very useful, by cutting the hedge within four feet of the surface, every second or third year, and selling what is cut off to ecopers or basket-makers: hazels are well known to make the best and most durable hoops, and generally bring a high price for that purpose.

Larch.-The lareh has not hitherto been much used as a hedge plant; from its

The Elder possesses a property, which along with the beauty of its flowers, will give it a preference to most other plants in many situations; namely, that of its being propagated from cuttings, with as much ear as the common willow.

growing so readily, however, and bearing the operation of clipping so well, it seems very much adapted for that purpose.—In exposed situations, where thorns would fail, the larch will be found an excellent substitute, and many fields may be inclosed with it, that would otherwise remain open.

Where it is intended to inclose a field with barches, the plants made use of, should be at least seven years old; and the strongest that can be obtained of that age. They should be taken up in the most careful manner, preserving the whole of the roots, and planted in a trench, where a considerable quantity of dung or compost has been put. The most proper season for this operation is about the end of November, or in the early part of January; at either of which periods, if they are carefully lifted, and replanted without any destruction of the roots, they will suffer no check whatever, and grow readily and vigorously in the spring.

When a line of hedge has been completely planted with harches, of the age and size above mentioned, they should be bent down, their tops properly entwined, and the side brancles afterwards trimmed with a pair of shears: this operation, by cutting off the extremities of the lateral shoots, will cause them to brush out a great number of new ones, which will soon render the hedge very thick.

But, if is should be preferred to allow the plants to remain upright, it may be done; the hedge will in that case look better, but will not so soon be useful. It may, however, be attengthened and protected for a time by a slight paling; and when the plants have attained a proper size, their side branches may be so intervoven and bound together, as to make a very good hedge. It is, however, worthy of notice that the tops ought never to be allowed to exceed the height of six feet; because, after they pass that height, the wind has so great an effect upon them, as to destroy any binding that may be made with their lower branches; cutting the tops has also another beneficial effect, namely, that of making then push out more vigorously below.

Larches have, however, one defect in common with hazels and some other plants, vie. the want of prickles, which certainly impairs the value of any fence made with them; as neither sheep nor cattle are disposed to respect any bedge, so much as those that are made with prickly plants.

Whins, or Furze.—In speaking of the plants adapted to the different soils, it was observed that some benefit might arise from noting, particularly the indigenous plants that grow, and attain perfection, in various situations. There is perhaps no kind of fence to which this observation is more strictly applicable than whin hedges; that plant

being known to grow spontaneously, and attain a great size upon soils, and in climates, where scarce any other would live.

In all cases, therefore, where whins are found growing naturally, and of any considerable size, bedges of them may with safety be attempted; but as the whin seldom grows to any considerable height, hedges are not often made with it, either upon the plain surface, or in conjunction with a ditch. It is generally upon the top of a pretty high bank, or mound of earth, that with hedges are sown; these banks have sometimes an equal slope on both sides; in other cases they only slope on one side, while the other is perpendicular, and faced with stone or turf. Pl. IV. hg. 92 as represents a whin hedge upon a bank faced with stone, and Pl. V. fig. 33; one upon the top of a hank faced with turf. This faces, when a sufficient number of plants can be reared, and brought to perfection, is a very good one, and from its numerous prickles, very effectually prevents both horses, sheep, and caute, from attempting to hreak through it.

It has however one defect, and that is considerable; being raised a good deal above the common surface, the plants are exposed to many accidents, arising from drought, frost, &c. 1 accordingly, it often happens in severe winters, that whole lines of whin hedges are killed at once. In the severe winter of 1794-5, numerous instances of that kind happened, both in the North of Scotland, and in some of the Northern counties of England; by which many fields that were, before the commencement of the winter, completely and substantially inclosed, were in the spring, from the frost destroying the plants, left in a naked exposed state. The Author of this Paper had occasion to see many instances of this kind the following summer, and heard much murmuring and regret amongst those concerned on that account; all of them alleging that thorns would have stood the winter infinitely better.\* That they were mistaken is very certain, and that the failure of the hedges, was owing more to their being raised so high above the common surface, and thereby exposing the roots to the operation of frost, drought, &c., than to the nature of the plants of which they were composed; this is abundantly confirmed by remarking what happens in England. In severe winters, that description of fence, which we have already had occasion to notice, by the name of Hedge-and-bank (or hedge on the top of a bank), and which consists of a mixture of almost every tree or hedge plant now known, is very often

<sup>\*</sup> Whins or furze, are also of various kinds; and it is believed that the Scotch are bardier, and less liable to be injured by the frost, than the English.

completely destroyed. The misfortune in both cases is owing to the same cause; namely, that of being raised so much above the common surface, having their pasture so much curtailed, and their roots so much exposed.

In making whin hedges, it has been disputed whether sowing the seed or transplanting is the most eligible. If it were fairly ascertained, that whins could be transplanted with safety, there can be no doubt, that hedges would be much sooner made in that way than by sowing .- A few experiments very carefully made, and which were completely unsuccessful, go a great way to destroy the idea of whin hedges being reared in any other way, than by sowing the seed: whins, it is true, if taken out of the earth either at a late period in the autumn, or very early in the spring, and immediately replanted, will continue to grow afterwards, especially if their roots are completely preserved, and perhaps a ball of earth taken up along with them; but notwithstanding every care that can be taken, they very often die; the wood is of a hard crabbed nature, close in the pores, and sends out new roots very reluctantly; in that way, unless the season is very favourable, they perish entirely. In short, it would appear that the whin does not agree with transplanting, that it often fails when the trial is made, and that the only certain way of rearing good whin hedges, is by sowing the seed, which, though it requires considerable time and care to bring the plants to perfection, is in the end more certain.

There is one circumsance connected with whin hedges, highly deserving of notice; a firer growing to a certain size, they are apt to turn open and naked at bottom. In that way, they are not only less valuable as fences, but are more liable to be killed by frost, or drought. When a whin hedge har run up to a considerable size, and is become abandy and naked, if the proprietor wishes to improve it, he abould cut it down close by the ground, take out the weeds, and lay the earth up to the roots; by this operation an immense quantity of new about will be produced, which, with proper care, will soon form a thick immensable fence.

Of the attention necessary to keep a whin hedge in good order, most people seem to be ignorant. Almost every other description of plants, with which hedges are made, have some weeding, trimming, and dressing bestowed upon them; the whin alone is left without any of these, of course it runs up, grows unmanageable, and becomes naked, in the manner we have noticed.

It is somewhat surprising that farmers have not taken a hint, from observing what happens to whin bushes, that have been much eaten by sheep, or cattle; the cropping by these animals, resembles a clipping, and has the effect of making them grow uncommonly thick and compact, winess the great numbers of them that are seen upon many of the moors in the kingdom, which, by frequent cropping all round, appear like so many small pyramids; and are so close, as to brid defiance both to the weather, and the attempts of animals to break through them.

If a similar mode were adopted with all young whin hedges, very beneficial effects would arise from it: if the seed were sown in a drill, the plants would come up uniformly in a line; and if they were afterwards trimmed or clipped annually at the sides, leaving the top shoots entire, the fence would soon become thich, beautiful, and rollandid, and would by its closeness so completely exclude the frost, as to preserve the plants in a great measure from the misfortune of being killed by it, an accident to which with hedges are so hids. In exposed situations, where other plants do not thrive or, yow readily, the whin under judicious management promises to be extremley useful.

Brambles.—It has been recommended by many, to mix brambles with hedge plants, with a view to render the hedge thicker an attronger; we have already noticed the disudvantage of mixing different plants in the same hedge; to this particular plant the objection applies with great force. Though the bramble sends out memerous long shouss every year, these shoots seldom live above two, or at most three years, and die nearly in the same manner as the rap. In a hedge, therefore, where brambles are numerous, and have their brambles intervouren with the other plants, by the yearly deep of a certain part of their shoots, they soon fill the hedge with dead wood, which has not only an utily appearance, but it also hunfull to the other plants, of which the frence comists. Besides, the leaves of the bramble are so broad, and numerous, as nearly to deprive every other plant with which they are mixed, of the benefit both of the sun, and atmosphere. This is not options merely, it is confirmed by facts, as in almost every case where there are brambles in hedges, they establish themselves at the expence, and in general the utter ruin, of every other plant.

If the shouts of the bramble were like those of thorus, or indeed any other description of hrdge plants, and were capable of filling up the spaces they occupy, and living for a number of years, a very good and handsome fence might be made with them in conjunction with a railing, with which they might be warped; such a fence, if the plants were sufficiently numerous, might be made in a couple of years, which, along with its inclusing the field, might become an object of profit, on account of the fruit, which when the plants are reared above the common surface is very plentifal, and might be employed in making cither a species of wine or brandy. This is no visionary idea, the thing has been long known and practised in France, where they make a great quantity of most excellent brandy, from the fruit of the bramble annually. In an after part of this Paper, we will have occasion to mention other plants, that can be propagated with great ease, and which if employed either by themselves, or in conjunction with others, would not only make excellent fences, but would produce immense benefit, both to the owner, and the public.

Multerrist.—The mulberry is known to grow and thrive, not only in England, but in North Britain; hitherto it has been but little cultivated for any purpose, but there is great reason to believe that the general use of it for fences, might prove highly beneficial, not only for inclosing the lands, but for food to cattle, &c. who are known to be uncommonly fond of the leaves; and also for the sustrance of silk worms. Several successful attempts have been made to propagate this plant, for the purpose of feeding silk worms; one in particular at Dalketh in Scotland, where there are above a dozen very beautiful mulberry trees, upon which silk worms are regularly fed; and though this experiment has been made by the owner, more from motives of curiosity than profit, the success of it has been such, as to afford an encouraging prospect to any attemps that may be made upon a larger acale. For the raw material of silk, our present dependence is upon foreign nations, and much money; is annually sent out of the kingdom to procure that article; could we produce it at home, the

An intelligent French emigrant, the Author of a work lately published at Edinburgh; entitled, Promenda autour de la Grande Britagna, par un Officier Français Emigra; takes notice of the slar, and the uses to which it may be applied. Speaking of the propensity of the Highlanders to the use of spirits, ite says,

<sup>&</sup>quot;As nothing can present the inhabitants of these mountains from drinking strong liquors, I whall endeavour to procure for them, one more agreeable to the plaints, and wholesome than their wholes. There are various districts in Great Britain, where slees are produced in abundance. I have seen the personais in the neighbourhood of Thiosentlin in France, make a printousi liquor of the place of the slow, which they prefer even to wine. The mode they pursue is very simple; all why have to do, is to bruise the faint and the karnels thoroughly, then to present out he plair; and "after subjecting it to the process of fermentation, distill is in the same manner as they do brandy from wine."

There can be no doubt but the juice of brambles, currants, gooseberries, and other small fruits, may be manufactured into spirits in the same manner.

advantage to the nation would be great, not only by keeping the money at home, which is at present unavoidably expended in the purchase of raw silt; but by the employment that would be thereby given to an additional population: and what would encrease the value of such employment, it would be given chiefly, either to infirm old people, who are incapable of hard labour, or to young girls and boys, whose tender years, and want of strength prevent them from engaging in more laborious employments.

Misculaneous Articlets.—It is proper to bring under the consideration of the reader, in a general treatie of this nature, the possibility of making use of the smaller kinds of fruit trees or shrubs, not only as a means of inclosure, but as a valuable source of produce. For instance, few plants yet known grow more readily, or seem better adapsed for hedges than the gooseberry; some varieties of which rise to a considerable height, grow very thick, and by the strength and number of their prickles, very effectually prevent any animal from attempting to break through them. In the lower districts of the kingdom, where the soil is deep and of a good quality, and where it is intended simply to inclose the field, very good hedges may be made with gooteberries, which, at the same time that they answered every purpose of a fence, would be valuable on account of the fruit, which might be converted to many useful purposes. The gooseberry, the white currant, and several of our small fruits, are known to be equally rich, indeed richer than many varieties of the grape, and when properly treated, yield both brandy and wine, of a quality no way inferior to some of the best foreign wines.

## Walls.

These are made with different materials, and differently denominated in various parts of the kingdom; in England they are uniformly known by the name of walls; in Scotland, they are more commonly called dikes, and are distinguished as follows,

- 1st. Dry stone walls, coped and uncoped.
- 2d. Stone and lime ditto, coped and uncoped.
- 8d. Galloway dike or wall.
- 4th. Stone and clay, coped and uncoped.
  5th. Stone and clay harled, or dashed with lime.
- 6th. Dry stone, lipped with lime.
- A gooseberry has lately been introduced into Scotland, known by the name of the Ironmonger, which seems well adpted for a fence, as it grows higher and stronger than any other yet known.

7th. Dry stone, lipped and harled, or east.

8th. Dry stone, pinned and harled.

oth. Brick walls.

10th. Frame walls.

11th. Turf ditto.

12th. Turf and stone in alternate layers.

13th. Mud walls, with a mixture of straw.

All of which, when properly executed, are valuable as fences; some of them, however, are of a very periabable nature, and though exceed at small expence, their cheapness is more than counterbalanced by their transitory value; amongst these are to be ranked (Pl. V. fig. 38, 39, and 40), all of which are in the highest degree periabable, and should never be had recourse to, except in cases where better materials are not to be had. The other descriptions of walls, when properly executed, will last, many years.

As there are certain points connected with the building of walls, the observance of what he essential, not only to give them a decent appearance, but also to make them, last; we think it necessary to notice them before entering upon the separate account of each.

- 1. That the stones shall be either taken from a quarry, or consist of the largest kind of land-stones, broke or blown in such a manner, as to take away their round shape, and give each of them a sufficient degree of flat surface, to bind and consolidate the building.
- a. That they shall be built by masons sufficiently experienced, who are able to give each stone as much flat surface as possible, and carefully pin or fill up every vacuity between them with small stones.
- 3. That the wall shall have, as far as circumstances will admit of it, a dry foundation, sunk so deep as to place it beyond the reach of frost, and other accidents to which walls built upon the common surface are so very liable.
- 4. That the wall shall be so broad at the foundation, as to admit of a gradual spert upwards, till it terminates in a breadth of about 10 inches, where the coping is applied; the readiest way of preserving this shape is by a frame and plummet, which serves as a complete direction to the mason, and keeps the walls of an uniform taper throughout.

5. That the coping shall consist of materials that cannot be readily overturned, or removed; as, upon the manner in which it is finished, much of the future value and durability of the wall will be found to depend.

An attention to these points is essential, indeed indispensable in the formation of this description of fences.

131. Dry Stone Walls.—Dry some walls are sometimes erected by common labourers, with the round some gathered from the fields, and coped with sod; in other cases, they are made with quarried stones, upon which some pains have been beenoved to put them into proper shape; a third kind, known by the name of Galloway dike, and so denominated from the circumstance of its being originally used in that country.

The first of these, yiz, the wall or dike made with round or land-stones, by labourers, and covered with a coping of sod, is a very indifferent fence. In most instances, it is not only very ill constructed as to shape, being of one uniform thickness from top to bottom; but the stones, from their mond figure, do not present a sufficient surface to each other, to bind and give sublifty to the building.

This fence has long been known, and is still very common in the remote parts of the country, upon estates where the first rude easy is made in the way of improvement, and where masons cannot readily be had. In such situations it has a two fold benefit, the surface is cleared of many atones, that would otherwise have presented a considerable obsacle to its cultivation, and the field is at he same time inclosed. But, though these objects are accomplished for a time, their benefit is not permanent, as the wall is perpetually tumbling down; even the cattle rubbing against it make considerable gaps in many places; in that way, great trouble and expence are annually required to keep it in repair. Pl. V. fig. 34 represents a dry-stone wall coped with brick, and fig. 35, represents a dry stone wall, coped with turf.

When the stones with which dry walls are built, are quarried, and done by skilful masons, brand at bottom, tapering gradually upwards, and finished at top with a substantial coping, the fence has a very neat appearance, and has been known to last thirty, and even forry years without repairs. A good foundation is highly essential in the construction of this fence; from mine to twelve inches is the smallest eighth hat it should be below the common surface, especially if the soil is open and porous, and the largest and haveirest stones should always be laid undermout. In cases where the

materials do not require to be brought from any great distance, a hundred yards in length, by six feet in height of such a wall, may be built for f:8. or 20.\*

Where dry stone walls are built, that which we have just described deserves a preference, on account of its neatness and durability. It is not only nuch cheaper than one made with stone and lime, but is equally useful, looks as well, and admits of being practised in many situations, where lime is either exceedingly scarce, or not attainable but as an enormous prior.

In many cases, it is common after raining this wall to the wished for height, to level the top of it with loose stones, and leave it in that itituation, without any coping or other security. The consequence is, what might naturally be expected, the first person who attempts to climb over it, or the first horse or bullock that puts its head over the top, or attempts to rub itself against it, infallibily throws down a part of the stones, and in that way the fence is gradually destroyed. Whereas, when a substantial coping of stone and lime is given, the wall is so completely bound together and consolidated at top, as to bid defiance to any common injury. The coping of turf and mud, so common in many places, are by no means entitled to approbation; for though they may for a short time secure the top of the building, they soon decay, and cannot be procured, but by paring and cutting off the adjoining surface: for three reasons, turf, or mud copings are improper, even upon dry stone walls, upon those made with stone and lime, or stone or clay, as we shall afterwards have occasion to notice, they are totally inadmissible.

Stone and Lime Walts, &c.—To render stone and lime walls durable, they should be constructed in the manner above described, for dry stone walls; that is, have a good foundation, deep enough to prevent them from being hurt by frost, with a broad base, tapering gradually upwards.

It is customary in some partrof England to plant ivy both upon their dry stone walls, and upon unds are constructed with stone and key. This bas a good effect, not only in point of appearance, but after a while, it binds and strengthen them very considerably; there are several kinds of ivy, wire, the large and the small newed, the dark green and the variegated, all of which look well; those kinds, however, bouch have a perference that grow friends, and have the generate treadney to accede. Particular care should be taken not to plant by in the immediate neighbourhood of young trees, or hodges, sa, next to most, scoling can be come destructive to trees or hodge plant.

This sence, when properly executed, is (next to hedges) the most durable of any; it is, however, very expensive, and its superiority over the dry stone wall is so trifling in point of durability, as to render the latter the most eligible, it being greatly cheaper, and answering every purpose of a sence equally well.

For the building of this wall, stones taken from the quarry are to be preferred to the common land-anone; for though a mason may be able to remedy, in some measure, the inequality of surface in land-stones, by mixing plenty of line with them, yet experience proves, that walls made with such stones, nothwithstanding every care on the part of the builder, are much less perfect, and last much shorter time, than where quarried stones are employed.

This, like every other scone fence, should be secured at the top with a substantial coping of wone and lime; the best and most durable is that which is made with stones of the flag kind, laid together in the form here represented;  $\Delta$  the space between them being filled with a mixture of small stones and mortar. This coping, from its wedge-like shape, and the solid impenetrable surface which it presents to the weather, seems the best calculated of any, for the preservation of the building. When a stone and lime wall is left without a coping, which is too often the case, the moisture finds its way readily into the heart of it; it is, besides, liable to all those accidents already mentioned, in speaking of dry stone walls, when they are left without a coping.

When stone and lime walls are built, the season of the year at which the work is done, is none of the least important considerations; for if they are erected either at a late period of the autumn, during the winter, or very early in the spring, the froatening upon the moisture contained in the lime, will separate, and distunite its parts, and by that means destroy the cohesion of the building; the binding power of the lime, in such case, is entirely lost, and when summer arrives, it resembles dry sand, mixed with the utones.

Late in the spring, during the summer, or early in autumn, seems to be the most proper time for building stone and lime walls; at any, or all of these periods, there is every prospect of the lime drying properly, and not the smallest risk of its binding quality being hurt by the effects of from.\*

 In speaking of the binding powers of lime, the Author of this Paper begs leave to mention a circircumstance, which seems entitled to the notice of those who are erecting building upon these coaxt.
 The Rt. Hoo. the Earl of Wymass, in completing a line of inclosure upon his extasts so the south side Galloway Dile (Pl. V. fig. 36.)—The Galloway dike, as has been already noticed one is name to the circumstance of its being first used as a fence in that country. It is now, however, very common in most parts of Scotland, and in some of the English counties. It is principally employed for inclosing high grounds that are depastured with sheen, for the confining of which, it seems well calculated.

Front two feet, to two and a half, at the bottom, it is built in a regular compact manner with dry stones, in every respect the same as a dry stone wall, with a broad base tapering gradually upwards; the building is the hevelled with a course of flat stones, resembling a coping, in such a manner as that these flags or flat stones shall project two or three inches over the wall on each wide. Above these flat stones is laid a course of ragged round ones, placed upon each other in a way secure enough to give stability to the building, but at the same time so open as to leave a considerable vacuity between each; by which means a free passage is afforded to the light and wind, which blows through them with a violent whistling noise.

This rough open part of the building is generally raised three feet above the regular part of it, gradually tapering upwards, till it terminates in a top of about nine inches broad, every course of the rough stones being smaller than that immeritately beneath it. Its toutering appearance is so well calculated to prevent abeen, earlie, or other animals from approaching it, that it is skellom, indeed, that any attempt is made to leap over it. This circumstance, together with the case with which the stones are procured, in most of the situations where the Calloway dike is used, renders it a valuable fence.

The expense of erecting it will be very different in different situations, according to the ease or difficulty of procuring stones, the pitce of labour in the country, and other circumstanecs. In many cases where the fields to be inclosed are infested with large stones, the removal of which ought always to be a previous step in every plan of improvement, the inclosure may be made for a triffer, merely for the expense of masonwork. In no instance can it be dear; and in most situations, where the confinement of the stock, or the partition of a crop are the sole objects, this will be found to answer the purpose equally well, if no better than more expensive fences.

It has, however, one defect, in common with all other stone fences, viz. that it

of the Frith of Forth, was under the necessity of using salt water not only for slacking the lime, but for bringing it to the consistence of morter, after it was mixed with sand. Contrary to all expectation, the work done with the salt water took band sooner than what was done with first water, and continues firm and solid. This circumstance was communicated to the Author by the Earl of Wymness, neither shelters nor ornaments the country; indeed, in point of shelter it is the most defective of any, for compact stone walls of a proper height are capable of affording considerable shelter to the grazing stock in stormy inclement weather, an advantage which cannot possibly be expected from the Galloway dike, on account of its openness. On that account it appears much more eligible for the lower parts of the country where the land is valuable, where little shelter is required, and where the confinement of the stock, or the protection of a crop, are the sole objects.

The advantages of stone fences of every description are very considerable; they not only form complete inclosures at once, and by that means allow the proprietor to enter into immediate possession of every advantage, that can arise from the inclosing of his fields; but, by the little room they occupy, a considerable portion of I and is awed that would have been occupied by some other fences; and even that proportion of soil near the iddes of stone walls, which is at present for the most part wate, admits of being profitably employed, either in raising grain, postores, or other vegetables; and the walls, as we have already observed, may be usefully employed in rearing of fruit trees, or the different kinds of currants, gooseberries, &c. &c.

To these benefits we have, however, to oppose some defects. The best and most substantial fences of that description are peritabile in a greater or lest degree, according to the materials of which they are made, and the judgment shewn in their construction; and after a certain time, require considerable attention, and expense to keep them in repair; the shelter they afford to the stock; evop or passure, is also small, and in place of improving the scenery, they burt the general appearance of the country.

Walls of Stone and Cley.—In the construction of this fence, the clay is used like line, and is meant to answer the same purpose. It requires slender observation to convince inselligent persons, that a wall made with such materials in the ordinary way cannot be a durable one; for if the clay made use of in building the fence has been very moist, the summer's heat will dry it so much, as to leave considerable chasms in the building; these chasms must necessarily deprive many of the stones of that support which they require, and in that way, endanger the building. This, however, is not the only inconvenience with which this ind of wall is attended; the effect of the summer's un upon the clay parches it so completely, that when the wet weather commences about the end of autumn, it shooths the moisture like a sponge, and if it is overtaken by frost while in that state, the fabric results, bursty, and tumbles down

With the very best coping than can be given it, stone and clay walls must always be considered as a very exceptionable fence, as, however well it may be defended at top, the moisture will penetrate at the aides: if it is left without a cope, however, or is only coped with mud or sod, the evil will be greater, as the moisture will in that case find a ready passer downwards, and in that way sacferate the destruction of the wall.

Walls of Stone and Clay, dathed with Line.—This fence differs in no respect from that just now described, except in the harling, or dashing that is given it: where that operation is well performed, and at a proper season of the year, the coating of lime, by preventing the entrance of moisture, will add greatly to the durability, as well as beauty of the wall; so much so indeed, that some fences made in this way, where the clay was properly tempered, and did not contain too much moisture, and where a batting or dashing of lime was afterwards given, have been known to last nearly as long as walls made entirely with stone and lime. The durability of this, as well as the foregoing fences, depends upon its being properly coped.

Dry Stone Walls, lipsed with Linux—This fence differs from the ordinary dry stone wall, in having about two or three inches of it on each side lipped with lime, which gives it the appearance of being built entirely with atone and lime. Where the external appearance of a fence is an object, something is gained by this practice; in point of call last, however, it seems to possess very little advantage, over the common dry stone wall, which, when properly executed, lasts as long as that, we have just described.

Dry Stone Walts, lipped and barled.—This consists in nothing more than a harling or dashing of line after the other work is finished; this addition is to be considered merely as an improvement upon its appearance, and not as contributing to increase its utility, or render it a more durable fence.

Dry Stone Walls, pinned and barled.—This consists in first building a common dry stone wall, which, when it is findbed, the mason carefully pins or fills up all the interstices of the building with small stones, and afterwards dashes or harls it over with lime. The pinning, by filling up every vacant space, and affording complete support to the stones, in every part of their surface, adds considerably to the durability of the building, and the harling afterwards gives the whole a finished substantial appearance, which renders it at once agreeable to the eye, and durable as a form.

Dry Stone Wall, with a Paling upon the Top (Pl. XI. fig. 62).—Low stone walls are sometimes made with a light paling upon the top, and for particular purposes answer well, and have a handsome appearance.

Brick Walls (Pl. V. fig. 37; Pl. XI. fig. 61, and 62.)—Brick walls are seldom had recoourse to for ordinary inclosures, except in situations where stones are extremely scarce, as is the case, in many of the English counties, for pleasure-grounds, or for sarden walls.

Brick walls are of two kinds; the first consists of bricks only, and are built either with the brick on edge, in brd, or acress. Where the wall is built with bricks on edge, they are laid up with the edge or narrowest part of each applied to the other; the thickness of the brick in such a case constitutes the thickness of the wall. Where brick in bed is used, the bricks are laid flast, and the thickness of the wall is proportioned to the greatest breadth of the brick. When they are laid across, the thickness of the wall is the capal in the length of the brick.

In all of there cases, it is common to have a frame of wood of the height of the wall, with proper standards and supports at regular distances, which not only serve as an infallible direction to the builder, but also strengthen the wall very considerably. The benefit derived from these wooden frames is, however, only of a temporary nature, as that part of them which is let into the carth soon rots, and the building, by being deprived of its support, falls in consequence.

The most valuable use to which bricks are applied, is either for facing walls built with coarse stones, for gardens, or for beightening old stone walls; for the first purpose, they are an excellent article, and any wall fronted with brick is, for the purpose of rearing fruit trees, of equal value with one of the most expensive bewn stone.

Where it is intended to beighten a stone wall that is to slender too bear a heightening of sone, bricks either in bed, or on hedge, will answer the purpose very effectually, without rendering the wall top-beary.

It is to be noticed, however, that in every case, either where a wall is made entirely of brick, or heightened with it, there will be a necessity for arrengthening it at the back with pillars at certain disances from each other, as represented in P. XI. fig. 61, 62; these will add to the stability of the building, and if properly executed, will render it equally durable with a stone wall.

For hot-walls, they are very valuable, as they not only, by their numerous seams, allow the trees to be regularly and neatly trained, but are at the same time extremely convenient for shaping the flues that conduct the heat.

Where the price of labour is low, and clay of a proper quality, together with fuel, can be easily obtained bricks may be used with advantage for almost any purpose

where stone is at present employed; we believe, however, that their use will be chiefly confined to the facing of garden walls, to the walls of hot-houses, to hot-walls, or the heightening of old stone walls; in all of which, they will be very valuable, and will, at a small expence, answer the same purpose as hewen stone.

Brick wells are variously coped, in some cases they are coped with the common brick, set up in such a way as to form an angle upon the top; in others they are coped with a sort of tiles resembling the letter A, flat below and angular above, with a border projecting a little over the wall on each side. In different parts of England this coping is used for brick walls, and is found to answer the purpose very effectually; in some instances, however, the coping is entirely flat, which is disapproved of, on account of its not affordine so ready a descent to the moisture.

Frame Walls .- This fence is not generally known by the name here given it. In the East Lothing Report it is termed (with what propriety we cannot discover) A STONE PALING. It is constructed in the following manner: a frame of deal boards, of a width and heighth proportioned to that of the intended fence, is placed upon the line in which it is intended to be made, a proper foundation having been previously dug; the frame is then filled with stones of all sorts, gathered principally from the adioining fields; when the frame is filled to the top with such stones, a quantity of liquid mortar is poured in amongst them, sufficient to fill up every interstice; the whole is suffered to remain in that state till it is supposed that the mortar has acquired a suitable degree of firmness to give stability to the building, which in summer, when the weather is warm and dry, will not require above a day or two. The frame is then removed, and placed a little farther on in the same line, in such a manner as that one end of it shall join immediately with that part of the work from which it had been removed. In that way the line of fence is gradually completed, which, when the lime has been well tempered, and the proper pains taken to incorporate it with the stones, presents a smooth uniform surface, and has a firm substantial appearance.

There remains now very little doubt, that the durability of many of the ancient buildings was owing in a great measure, if not entirely, to their following this mode; as it is observed in taking down several of them, that the outside of the wall only, is faced with large flat hewed stones, which serve as a kind of plating or frame to the building, while the inside or middle consists of very small stones, and in not a few cases, of round well washed gravel, cemented together by pouring liquid mortar amongst it.

·Turf Walls. (Pl. V. fig. 38.)-In almost every upland or hilly district throughout

Britain this fence is met with, and for temporary purposes is found very useful. In a variety of instances it is used for inclusing the fields, and is practiced for that purpose to a very considerable extent; in others, however, it is used for the formation of folds, pens, or other places of confinements for castle during the night. In general the fence is made with untro only, pared off from the adjoining surface, and used without any mixture of earth; in others cases, the wall consists of a facing of turf on each side, while the space between is filled up with loose earths.

For a fold, or any other temporary purpose, this fence answers extremely well, but for inclosing a field, or indeed any other use where durability is required, it should never be had recourse to, as from the moment it is finished, its decay commences, and no pains not attention will be able to keep it in repair after it has atood two or three years. In a very exposed situations, bowever, it may be useful as a protection for young bedges, during the first three or four years of their growth; but as a wall of this kind, can in no instance be made without a destruction of the adjoining surface, which upon good lands is a serious loss; the protection of young hedges will be answered equally well, by low stone dikes, which, while they perfect the inclosure, will at the same time shelter the young plants, and clear the field of a nuisance.

Stone and Turf Walts. (Pl. V. fig. 39.)—This fence is very common in many simutations, where a better and more durable one could be made at equal, perhaps less expence. In many instances, however, it is had recourse to, from necessity, where lime is either very dear, or not attainable at any price. The stones used in the construction of this fence, are in general the ordinary land stones; with these, and the turf taken from the adjoining surface, the wall is made, using alternate layers of each. For temporary purposes this fence may be adopted in almost every situation, as it is rearred at small expence, and the materials are every where to be met with, almost without trouble: but in all cases where permanent fences are wanted, this will be found very deficient, even to the common turf wall, for the intervention of stones between every layer of turf, the sol is dried, the plants die, the turf as might naturally be expected soon decays, and the wall crumbles down; whereas, when it is built entirely of turf, with a being bank of earth behind, the herbage continues growing, and the whole turf of which the wall is made, soon consolidates into a uniform green sod, which with propercy are will last for many wears.

Mud Walls, with a Mixture of Straw. (Pl. V. fig. 40.)—Walls of this kind are very frequent in many parts of England, not only for surrounding their small

inclosures and stackyards; but also for constructing the walls of many of their farma houses and offices. In North Britain, they are used for similar purposes, and for subdividing houses into different apartments; for which purpose they answer equally well as lath and plaster, and last nearly as long.

When either the outside walls, or the inside divisions of a house are made of these materials, the custom is, to take a small quantity of straw, and incorporate it with a sufficient proportion of clay; the straw in this case, answers the same purposes hair in plaster lime. When a sufficient number of these are made, the work is begun by Jaying a stratum at the bottom of the intended wall; when this is doon, and the cliff-ferent pieces firmly kneaded, or wrought together with the hand, a flat deal board is applied on each side, which being properly pressed, and rubbed against the building in a horizontal direction, not only serves to consolidate the work, but gives it a degree of smoothness and uniformity; successive stratums are added, till the wall is raised to the intended helph, taking care to taper it gradually upwards. Walls made to this way, if properly constructed, will last for many years, and if dathed or harded with lime, at a proper season of the year, will have an appearance no way inferior to such as are made with stone and lime, along with this addition to their appearance, the harling or dashing with lime, if properly done, will, by preventing the access of moisture, render them much more durable.

When walls of mud and straw are to be made, pieces of wood properly joined and secured, should be set up in the direction in which the frence is to run. These should be in the form of a double paling (as represented in Pl. VI. fig. 41.), and calculated to answer the same purpose as the standards employed in making brick divisions in a dwelling house; the upright paras should be placed in such a mamer, as to be immediately opposite to each other (as represented in Pl. VI. fig. 41.), and placed at a distance equal to the thickness of the intended wall. These standards will not only render the fence firmer, and more durable, but will at the same time serve as a direction to the workness, in keeping to 6 a regular thickness and shape.

In England, where stones are scarce, and in many of the counties not to be had, walls of this description are the sine quannon, for many purposes, and when properly constructed, last a considerable time; but in every instance where stones are procurable at a reasonable price, a fence made with them, is greatly to be preferred; as it is in general built with less trouble and expence, and is at the same time much more durable. At best it is, however, of a very peritable nature, and the great

expence that is required to keep up such fences, has long since taught both proprietors and occupiers, that they are by much the most expensive of any.

Compound Fences.—By compound fences are to be understood, all those in which any two or more of the simple fences are combined; the following list comprehends the whole, or the greatest part of these,

1st. Hedge and ditch, with or without paling.

2d. Double ditto, with or without ditto,

gd. Hedge and bank.

4th. Hedge in the face of a bank.

5th. Hedge on the top a of bank. 6th. Devonshire fence.

7th, Hedge with single or double paling.

8th. Hedge and dead hedge.

9th. Hedge and wall.

10th. Hedge, ditch, and wall.

11th. Hedge in the middle of a wall.

22th. Hedge and ditch, with row of trees.

13th. Hedge and belt of planting.

15th. Reed fence, or post and rail covered with reeds.

1st. Single Hedge and Ditch, with, or without Paling.—To those who are acquained with this kind of fence, a description of it may sppear superfluous. The ditch is of different dimensions, according to circumstances; the thorns are for the most part placed upon the common surface, upon what is termed a scarcement, or projection of aix or seven inches, on which they lean, and which serves as a kind bed, when they are cleaned. By placing the plants thus far back, from the edge of the ditch, they are in a great measure secured against the accidents to which they would otherwise be liable, if they were placed immediately in the front of the bank; as there are few ditches, however carefully they may have been made, into which the earth does not afterwards slide, and fall in.

In cases, therefore, where the thorns are planted immediately in the face, or what is termed the brow of the ditch; if any portion of the earth falls in, it either carries the plants along with it, or deprives them of their nourishment; whereas, by placing them at the distance of six or eight inches back from the front, there is no risk whatever, of their being injured by the earth falling in.

It appears that the space commonly allowed for a scircement, is by far too little, being seldom more than four inches. In place of which, it ought never to be less than twelve or fourteen inches. This would have several advantages, as it would not only prevent all risk of the earth sumbling in, and bringing the plants along with it, but would at the same time afford ample room for weeding the hedge completely, and drawing up the earth, to the roots of the plants. These are mattern of considerable importance, and which, along with their destroying weeds, promote the growth of the hedge, by affording sufficient pasture for the plants, and enabling them to resist the effects of drought frost, &c. much more completely than they would otherwise have been able to do, if planted immediately in the fase of the ditch.

It is common to lay the hedge plants upon the plane surface, without any preparation whatever. In other cases, the first spadeful that is taken out of the ditch, is laid on the front, and the plants placed above it; whatever the soil or situation may be, it is of high importance to place the plants upon a bed of good rich well prepared earth. capable of affording them not only a due degree of nourishment; but into which their roots may strike with the utmost ease. Upon a very dry soil, and in elevated situations, it is sometimes necessary to place the hedge plants, considerably below the common surface, to prevent them from suffering by drought; where this is practised. the ditch is first dug of the ordinary dimensions, and the earth that is taken out of it laid about so inches back from the edge; the labourer then, with a spade, cuts down a space, about fifteen inches broad, and ten or twelve inches deep, along the whole front of the ditch; this space when cut resembles a shelf; an inch or two of the best mould, well broke and pulverized with the spade, is laid upon this shelf or scarcement, upon which the plants are laid, not exactly in a horizontal direction, but with the top a few degrees higher than the roots. The earth taken out in forming the shelf, is then replaced above the roots, in such a manner as to form a good slope, from the front of the ditch backwards.

the ditch backwards.

Where the soil is deep enough to admit of this being properly done, there are few situations, however dry, where the hedge will run any risk of suffering from drought.

In very cold wet situations, this practice is reversed; and in place of planting the hedge upon, or below the common surface, it is found necessary to raise it considerably higher; for that purpose the first two spadings taken out of the ditch, and which always consists of the best earth, are laid about ten inches back from the front; this, when properly done, forms a bed, of from twelve to filteen inches in thickness, upon which the plants are laid; the roots are then covered with the remainder of the best earth, and the bank formed in the ordinary way. Where the hedge is either wafter thorn, crab, or beceb, the precaution of raising it above the common surface, is essential to its welfare upon cold or wet soils: and in many of these situations, good hedge are made in that way, that could not possibly have been done by any other means. It must be admitted, however, that by raising it so much above the common surface, the pasture of the plants is in a great measure confined to the bank, formed by the earth taken out of the ditch; and in many instances, when the winters are severe, and much black front happens, it penetrates the bank so completely, as emirely to destrow the hedge.

In all cases where hedges are to be made either in this, or any other way, the soil, as far as circumstances will admin, ought to be eleaned, pulverized, and enriebed with line, compost, or other measures; which will not only enable it to push away vigour-outly, but as the same time prevent, in a great measure, the distempers of moss or cankering, to which bedges upon saif 'days or cold war soils are so lable.

In speaking of the simple ditch, notice has been taken of the necessity of giving it a proper slope, to prevent its tumbling in after frost, or being excavated by the run of the water. Where a hedge is added to the ditch, this precaution is equally essential, indeed more so, as the injury done to a simple ditch, can be repaired with the spade at little or no expence; whereas, when a hedge is planted in the front, any considerable portion of the earth falling down, brings the plants along with it, and makes a breach in the hedge, which no industry will afterwards be able to cure. To keep them pretty broad at top, and gradually tapering towards a point at bottom, ought to be a constant and invariable rule: ditches so constructed are seldom, if ever undermined, and retain their shape for many years. Upon disches so formed, from their containing little water at bottom, the greatest pressure and action of the fluid is upon the upper part, and upon that, from the nature of the slope, its effects are lost. Those who have made sufficient observations, know, that in every instance where water acts upon a perpendicular surface (especially if the soil is of a soft incoherent nature), its force is greatest; whereas, when it operates upon a sloping bank, its face is short, and it does no injury. A knowledge of the laws of hydrostatics explains this. The pressure and operation of fluids, is always in proportion to their altitude or perpendicular height. Upon a aloping bank this pressure is lost; and the more gradual the slope, the less effect the water has. It is owing to this circumstance, that the low aloping parts, both upon the banks of rivers, and on the sea coast, continue unahered for many ages, while the high bold parts of the abore, unless they are entirely of rock, are continually tumbling down.

The same thing holds good in regard to ditches: whatever the height of the column of water may be in the middle, or however rapid the current, the narrowness of the ditch at bottom, and its sloping gradually upwards, divides and diminishes the force so completely, that it is scarce felt upon any part of it; whereas, when the ditch is validated, and of one uniform width from top to bottom, the water, by being confined almost initirely to the under part, runs away the soil, and excavates and undermines the sides of the dicht, which occasions their falling in.

In cases where the purposes of the proprietor or occupier require, that the fields recently inclosed with ditch and bedge should be made fencible at once, it is very common either to surround them with a paling placed upon the top of the bank formed by the earth taken out of the ditch, or with a wall of coarse loose stones, in the form of a Calloway dike, placed also upon the top of the bank. Pl. VI. fig. 43, represents a young hedge protected with an open wall of this sort. Where stones are plenty, this last forms an excellent fence for the purpose of confining the cattle, and is at the same time a good shelter for the hedge.

When a paling it placed upon the top of the bank, it is made of different materials, according to the circumstances of the case; in some situations it is made of falshs, in others of laths, the prunings of fir plantations, &c. in all of white, when properly excuted, it not only answers the purpose of a temporary fence, but at the same time serves as a complete protection to the voung hedge from the deprehations of sheep, cattle, &c.

Double Dileb and Hedge (Pl. I. fig. a.)—In speaking of the double ditch as a simple fence; its use, and the various situations in which it is applicable, whether as a fence, or an open drain, have been noticed at some length. To what was there mentioned, we have now to add, that the custom of inclosing with double ditches, and a bedge in front of each, is now practiced in many parts of Britain, especially upon what are termed cold lands; from an idea, that a single row of plants would not grow sufficiently strong or thick, to form a proper fence. The advocates for this fence father allege, that a slong with the two rows of plants forming a more sufficient fence.

an opportunity is afforded, of planting a row or rows of trees on the middle of the bank, as represented in Pl. XI. fig. 64; we shall afterwards have occasion to notice this last as a very exceptionable practice.

The double dirch and hedge is liable to many objections; the expence of forming the dirches, the hedge plants made use of, and the ground occupied thereby, being double of what is requisite, in a single dirch and hedge. From 120 18 or 30 feets the least that is required for a double dirch and hedge; this space, in the circumference of a large field, is so considerable, that upon a farm of 500 acres, divided into 15 inclosures, the fences alone will occupy above 40 acres. By throwing up a bank in the middle, the whole of the nourishment not only of both hedges, but also of the row of trees, is confined solely to that space, which, from its being insulated by the dirches, and clevated so much above the common surface, not only curtails the nourishment of the hedges and row of trees, but exposes them to all the injuries arising from drought, frost, &cc. &cc.

The idea of two rows of plants making a better hedge than one, is certainly no good reason, for such an unnecessary waste of land and money; as in almost very instance, where the plants are properly adapted to the soil and climate, one row will be found quite sufficient; but if it should be preferred to have two rows, which, we repeat, will for the most part be found unnecessary, the purpose will be answered equally well with a single ditch, or even without any ditch at all; for in every situation where the soil is tolerably dry, and the fields much elevated above the level of the sac, the ditch, except for the purposes of drainage, may be dispensed with. In addition to the double ditch, and while the hedges are still young, the fence is sometimes strengthened by a paling, either of young fits or other wood placed upon the top of the bank; in other cases, a dead bedge is planted in the middle between the two quick-hedges, and not unfrequently, an open wall resembling a Calloway disk, made with round stones, is placed in the same situation; any of which, when properly executed, not only inclose the field completely for the time, but also very effectually select the young plants.

The great experce, the waste of land, and the little superiority which this fence possesses over the single bedge and ditch, are sufficient reasons for laying it aside. The argument used by many, of two ditches holding more water than one, and of course rendering the field so inclosed, drier, is unworthy of attention. The purpose of ditches, when properly understood, is not to retain, but to earry off water; and their chief benefit depends upon their being so constructed as to answer this last upurpose completely;

a ditch must be large indeed, that is capable of containing the whole of the water running from a large field.

Hedge and Bank (Pl. I. fig. 3) .- This fence consists of a hedge planted upon the plain surface, with a bank or mound of earth raised behind it, by way of protection. A very good idea of this fence may be formed from the above figure. This bank in some instances is faced with sod on both sides, sloping gradually towards the top; while in others, and indeed by far the greatest number, it is only faced on one side, which is nearly perpendicular, and has a gradual slope on the other, similar to the bank made with the earth, taken out of an ordinary ditch. The bedge is frequently planted at the bottom of the perpendicular side, that is faced with sod : but in many cases, it is planted on the other side, near the bottom of the sloping bank of earth. The last is certainly the best situation for the hedge; for if the earth with which the bank is made, has been taken as it generally is, from the side that is faced with sod, this facing will form a kind of sunk fence, the bottom of which will be considerably below the common surface; of course, any hedge planted in such a situation, will not only be put into the worst of the soil, but will at the same time be in danger of perishing from the moisture lodging there, and chilling the roots; whereas, when it is planted on the other side, near the bottom of the slope, the plants have the best of the soil to strike into, and are in a great measure secured against the bad effects of moisture lodging and chilling their roots.

In bleak exposed situations, where hedges cannot be successfully rearred without shelter of some blank of earth is a good contrivance, as it screens the young plants from the inclemency of the weather, till they acquire a degree of strength sufficient to enable them to resist the rigour of the climate, which it is now well known, many plants are able to do after they arrive at a certain age and strength, that would have been completely killed, had they been exposed in the same situation, and without shelter, at an earlier period.

In such cases, therefore, earthen mounds similar to what we have described, or stone walls, are essential to the rearing of good hedges, especially of white thorn.

This fence, like the common unif wall, cannot be erected without a considerable destruction of the adjoining unifiee, on that account, it should never be used but in cases of the strongest necessity. The only lintance in which it can be made without any loss, is upon the sides of highways, as represented in Pl. I. fig. 4, where the road is not bounded by a disch, but slopes gently to each side is, in that case a sufficiency

of turf and earth, for facing and forming the bank, may be had from the side of the road. This will have a double advantage; the earth, if taken from the road with judgment, and in such a way as to form a gradual slope from the niddle towards the sides, will produce two very considerable advantages; the slope will keep the road perfectly dry, and the earth taken from it will, with the assistance of a slight paling, completely inclose the field, and serve as a protection to the young hedge.

It is worthy of remark, that when the hedge is planted behind the bank, the paling should not be upon the top, as is commonly the case, but on the side next the field, to serve as a protection against the eathe grazing in it; when it is next the road, bowever, the paling may be placed upon the top, in which ease it will render the fence more insaccessible.

Hedge in the Face of a Bank (Pl. VI. fig. 44.) .- This fence differs from the former, principally, in having the hedge in the front of the bank considerably above the common surface, in place of having it at the bottom, as already described. The work is executed in the following manner: the bank faced with sod on one side, and having a gradual slope on the other, is raised to the height of 18 inches, or two feet . the top is then levelled, and covered with two inches of good earth, above which the plants are laid horizontally, with their tops projecting about a couple of inches over the edge of the hank; the roots are afterwards covered with the same mould, and the bank raised to the desired height. This fence is greatly inferior to that already described, as the hedge plants, by being raised so much above the common surface, are liable to great injury, not only from the bank decaying and mouldering down, and by that means depriving them of their nourishment and support, but also from the effects of frost, drought, &c., &c. In many instances, however, it may be useful, especially in the inclosing of wet lands, where hedges would not thrive, if placed upon the common surface: but in such cases, it is worth while to notice, that great advantage will arise, from placing the hedge plants about eight or ten inches back from the front. upon a sort of scarcement similar to what is done in the common ditches. When planted in this way, there is little, indeed no risk of the bank mouldering down; and the shelf or scarcement left, admits of the hedge being completely cleaned, and the earth drawn up to the roots of the plants; circumstances essentially necessary to the future welfare of the hedge.

Pl. V1. fig. 45, represents another description of hedge and bank, which is met with principally, by the sides of highways, in situations where the ground has a sudden declivity towards the road; in these cases, it is common to cut down the face of the bank in a sloping direction, to within 18 or ao inches of the bottom, where a bed is made of about two feet broad, covered with good earth broke very small; upon this the plants are laid, with their extremities about 9 inches from the front; the roots are then covered with eight or nine inches of good mond; the bed below with the projection in this case, serve the same purpose as the scarcement of the common ditch, and affords complete room for cleaning, and drawing up the earth to the roots of the hedge.

In the construction of this fence, it is essential to give the face of the bank such a slope, as to prevent the earth from tumbling down; if this is neglected, it will be continually falling in large masses after every frost, or fall of snow or rain.

It is sometimes the practice, however, instead of planting the hedge wikin a8 inches of the bottom, as here described, to slope the bank first, in such a way as to insure it against tumbling down, and plant the hedge upon the top, as the distance of about a foot and a half from the verge of the bank. A hedge planted in this way, when it thrives, will certainly look much more formidable than one planted at the bottom; but it will be liable to more accidents than the other, from drought, frost, and the falling in of the bank. Upon this subject more will be said, when we come to speak of the hedge upon the top of the wall.

Hedge and Bank, or Hedge on the Top of a Bank (Pl. VI. fig. 46.)—This fence is common in many parts of England, and also in some parts of Scotland, and consists of a high bank of earth taken from the adjoining ground, pretty broad at bottom, and tapering gradually towards the top, upon which the hedge is planted.

From the opinions and observations of the most intelligent persons who have communicated with the Board, this appears a very objectionable fence. It has already been noticed, in speaking of hedge and bank, that the surface of a great part of the adjoining ground is pared off, and in that way a theft is committed upon the soil, which cannot be easily repaired; and even after the bank is formed, it is incapable of retaining a sufficiency of moisture, to nourish the plants during summer, and in severe winters, the frost penetrates the bank so completely on all sides, and acts so forcibly on the roots of the plants, as sometimes to kill a whole hedge at once. This mifortume happens very often to old strong thorn hedges, but more especially to whin hedges, many of which, after the severe winter of 1794-69, were completely killed for miles together. In the neighborhood of Lawrence Kirk, on the great post-road leading to Aberdeen, many fields which were completely inclosed by whin hedges, before the winter set in, were in the spring laid quite open by the total destruction of the fence.

But allowing this fence to be exempted from the bad effects both of frost and drought, there remains one circumstance to be mentioned, which of itself is sufficient to bring it into disrepute. Turn or earth taken from the common surface, when pat into a bank, and raised so much above the situation in which it originally was, becomes unfit to nomish, or support the herbage which formerly grew upon it: in that way the plants die; their place is supplied by a species of most, which is well known to be very unfirently to the growth both of hedges and trees, not only by rendering the soil loue and incoherent, and thereby subjecting the plants to every linjury that can arise cither from frost or drought, but also by covering their bark; a circumstance which, when it once takes place, is, unless great care is taken, talkmarby fals to their.

It is deplorable to see the wretched situation of many fences, both in England and Scotland, from that cause alone, which, in place of having many vigorous shoots, abounding with numerous lateral branches, consist only of naked stumps, covered with moss. This disease upon certain soils, as has been already noticed, attacks even hedges planted upon the common surface, but where the hedge is placed upon the top of a bank, it is liable to it, upon every description of so;

Devousitire Fence (Pl. VI. fig. 47).—The Devonshire fence consists of an earthen mound, seven feet wide at bottom, five feet in height, and four feet broad at top, upon the middle of which, a row of quicks is planted, and on each side, at two feet distance, a row of willow stakes, of about an inch in diameter each, and from eighteen inches to two feet fong, are stuck in sloping a little outwards; these stakes soon take root, and form a kind of live fence, for the preservation of the quicks in the middle.

The Devonshire fence so nearly resembles the hedge on the top of a bank, that any additional observation upon it may perhaps appear superfluous. It is equally expensive in the exection, the formation of the bank deprives the adjoining surface of its best soil, and the plants made use of, are liable to every injury that can possibly arise from drought, frost, and the gradual decay or crumbling down of the mound. The addition of the willows to this fence, is certainly a disadvantage; if the quicke require protection, dead wood is equal to every purpose that could be wished or expected; and at the same time possesses the additional advantage of requiring no mounthment, and having no foliage to shade the quickels.

Hedge with Post and Rails (Pl. VI. fig. 48.).—Palings are frequently employed for the protection of hedges, as well those, that are planted upon the plain surface, as for the hedge and ditch united.

The addition of a paling becomes more immediately necessary, in cases where the hodge in planted upon the plain surface, especially when the fields so inclosed, are in pasture. If only one field is inclosed in this way, and the adjacent lands are under a corn crop, a single paling on the inside of the inclosed field will be quite sufficient for its protection; but when the adjacent fields are also under pasture, a double paling becomes necessary, or, in other words, a paling placed on each side of the young hedge, as a sufficient distance to prevent the aheap or entals from cropping it; without such protection the hedge plants are not only liable to cropping, but also to being trodden and destroyed by their feet, an injury which, when it happens at an early period of their growth, the plants continue low and stunted ever after.

Hedge and Dead Hedge (Pl. VII. fig. 49.) .- This fence consists of a row of quicks or other hedge plants, set either upon the plain surface, or in the face of a ditch or bank. The dead hedge answers a double purpose, namely, that of protecting the young plants from the injuries they may receive from cattle, or the inclemency of the weather; and, at the same time, forming a temporary inclosure, which lasts till the hedge is grown up. Where dead hedges are made of proper materials, such as the cuttings of thorn hedges, &c. and are well let into the ground, they answer these purposes very completely, and should always be used for the protection of young hedges, where the materials can be obtained at an easy rate. It is worthy of notice, however, that in every instance where dead hedges are used for the protection of live ones, in place of cramming them close together, as is commonly done, there should be a distance of least three feet between them. In that way the hedge plants will have room to grow and spread out their lateral branches at bottom, a thing essentially requisite to the formation of a good hedge, while an opportunity will at the same time be afforded of weeding the hedge, and loosening the earth completely on both sides of it.

Hedge and Wall (Pl. VII. fig. 50.)—This fence is of two kinds, one of which has been already described, namely, where a coarse open wall, made of loose stones, and resembling a Galloway dike, is made upon the top of the bank, formed by the earth taken out of the ditch. The second is chiefly used when hedges are planted upon the plain surface; in which case the wall, though thin and low, is regularly builty and answers the double purpose of abeltering and encouraging the growth of the plants, while they are in a weak tender state, and afterwards prevent the possibility of the hedge becoming open below, where guidess are entirely, or in part surrounded by hedges, and in the inclosing of fields by the sides of highways, especially in the vicinity of great towns, where dogs and other destructive vermine are apt to creep into the inclosures, and annoy the stock; the low wall forms a valuable addition to the fence.

It is customary in some cases, after the bedge has statined a certain beight, and is thought to be out of danger, either to remove the vall entirely, or allow it to decay. This is certainly a bad practice; as it not only leaves the bottom of the hedge naked and open, but at the same time deprives the roots of the plants of a protection to which they have long been accustomed, and the removal of which operates, as a severe check to their growth. In every instance where the wall is intended to be removed, earch stould be taken to cover the roots of the plants, that are left exposed, with good earth; by that means they will be prevented from being hurt by exposure to the westher, and they will suffer little, if any, check. It frequently happens, however, to the utter disgrace of the proprietor, that the wall is removed, and the roots of the plants left naked, and exposed to every injury. In such ease, if the hedge has been planted a little above the common surface, as soon as the wall is removed, the earth begins to monitor and fall down, and continues to do so till the plants deprived of their unsoon; tumble down also, and the hedge is by that means entirity valued.

Thate is another description of hedge and wall, which properly comes under consideration in this place: that is, when the hedge is planted upon the top of the wall; this differs fram a hedge on the top of a bank, already described, only in one particular, which is, that of the bank being faced with somes, instead of sod or earth. When such a fence is attempted in a level country, the wall must be very broad, not less than four or five feet, and the middle of it filled with earth; in short, the construction should be nearly the same as the Devonshire fence already described, only the facing on each aide to consist of stones, in place of turf. The objections made to the Devonshire fence apply, with equal propriety, to this, being expensive in the erection, troublesome to keep in repair, and perhabble in its nature.

There is however another kind of this fence, which in particular situations is extremely useful: that is, where the land has a considerable declivity, which terminates abruptly on the side of a highway, or an inclosure running along the side of high grounds, that lean very much to that side where the fence is intended to be made. This fence in the face of banks, represented Pl. VII. fig. 5, 1.is commonly executed with a perpendicular front, and without any contrivance for carrying off the moisture-1 in consequence of which, after bad wimers, or long continued rains, the earth swells, the wall bursts, and is thrown down: when the wall is of dry stone, there is filler risk of this accident happening, as its open texture reality admits of the moisture passing through it; but when the wall consists of stone and lime, stone and day, or any other that prevents the exit of the moisture, the carth, as already mentioned, swells, and the wall bursts, and is thereby desvoyed.

To render a facing of his sort durable, it is requisite, if the wall is built with stone and lime, or a mixture of elsy, turf, or any other materials, that resist the passage of water through them; instead of building it perpendicular, as is commonly done, to give it an inclination of some degrees backward, and to have openings at the bostons, at regular distances from each other, for discharging the moisture that may issue from the bank. In order to render these openings as completely useful as possible, it should have a space at the back of the wall, and immediately at the bottom, of about 12a inches broad, and the same depth, falled with small round stones; these, by serving as a kind of drain, will receive the moisture that soaks down, and afford it a ready exit by the openings we have described.

Hedge in the Middle, or in the Face of a Wall (Pl. VII. fig. 52.)-This fence, like the last described, can only be made in the face of a bank where the land rises immediately behind it: the practice is new, ingenious, and deserving of attention. It is executed in the following manner :- the face of the bank is first cut down with a spade. not quite perpendicular, but nearly so; a facing of stone is then begun at the bottom, and earried up regularly, in the manner that stone walls are generally built; when it is raised about 18 inches, or two feet high, according to circumstances, the space between the wall and the bank is filled up with good earth, well broke and mixed with lime or compost; the thorns are laid upon this earth in such a manner, as that at least four inches of the root and stem shall rest upon the earth; and the extremity of the top shall project beyond the wall. When the plants are thus regularly laid, the roots are covered with earth, and the building of the wall continued upwards, filling up the space between the wall and the bank gradually, as the wall advances upwards; when completed, the wall is finished with a coping of sod, or stone and line. When the plants begin to vegetate, the young shoots appear in the face of the wall, rising in a perpendicular direction.

Sir James Hall, of Dunglass, has adopted this mode of inclosing pretty extensively upon

his estates in East Lobian, and is the first who introduced that plan on the east coast from Gallom. The appearance is at once new and handsome; the whole scems to be in a very thriving condition, and in several parts the hedges have made great progress; most of them however being young, no decisive opinion can be formed as to the real advantages or defects, with which this mode of inclosing may be attended. Apparently, it is itable to several objections. In the first place, if from weakness, or other accidents, any of the plants abould sicken or die, a circumstance by no means uncommon, even where every possible care has been taken, to select the stouest and best; the defect thereby occasioned cannot be repaired without taking down the wall, at least as far as the place where the hedge was laid; this will be found highly expensive and inconvenient; the inconvenience would however be less sensibly felt, if the failure of the plants happened only in one part of the wall; but when, as will always be the case, the plants misgive in many different places, it will be found a very expensive and arduous business, to take down and rebuild the wall in every place where two, three, or more thorus have failed.

Were this labour and expence repaid by any extraordinary advantages, the practice might derive additional strength therefrom; that, however, is far from being the case; for though the plants in a hedge of this sort are, from the great quantity of earth laid upon their roots, less liable to injury from drought frost, &c.; they are at the same time farther removed from the scalai influence of the sun and attomobeler.

There is one striking defect in the management of this fence, and we mention it with reluctance, as the proprietor is amongst the number of those who have paid great attention to the subject, and spared neither labour nor expence to set h good example. The defect we mean h in the dressing of the hedge, and proceeds upon ministance principles: in place of allowing the plants to attain a certain size, say four or five feet, without cutting the tone, which when speaking of hedges in general, we have observed ought always to be the case, both the middle serms and lateral branches are regularly cut and swinghed once or twice a year; under this impression, that frequent cuttings, by multiple the shoots button out at tog, multiplies their numbers, and renders the bedge thicker and stronger. This idea is, in one respect, well founded; the numbers are no doubt increased by this mode of management, but their strength, stem individually, is thereby diminished; and in propriotine to the length of time during which the practice is continued, the top shoots become gradually smaller and weaker; of course, the father progress of the hedge upwards is prevented, and nothing can

remedy the evil, but cutting down to the bottom, and allowing a sufficient number of vigorous shoots to come up. It is only, by allowing each plant to send up one or two stems to the height of five or six feet, that a strong durable fence can be formed; that point once gained, the whole of the after-management will consist in keeping it free from weeds below, pruning the side branches properly, and preventing its farther storetts utwards.

In an experiment, the Issue of which is still uncertain, it may appear rash to hazard a conclution; but from every observation it would seem, that a hedge planted behind the top of the wall, like that last described, would sooner become a fence, would be leas expensive, and liable to fewer inconveniences, than that, we are now speaking of. In the former, a neasy opportunity is alforded of filling up the vacancies occasioned by the death of any of the plants, without the troublesome and expensive process of taking down, and rebuilding a part of the wall.

Hedge and Ditch, with Row of Trees (Pl. VII. fig. 53, and 54.)—The different kinds of hedge and ditch have been already described; the present differs from them only, in having a row of trees planted in the line of the fence along with the hedge.

The advocates for this practice say, that by planning hedge rows of trees in the direction of the fence, the country is at once sheltered, beautified, and improved; and that the interest of the proprietor is ultimately promoted by the increasing value of the timber raised in these hedge-rows. It is also said, that such trees produce more branches for stack-wood, kneet for ship-builders, and bark for the tanners; and they sell at a higher price per load than trees grown in woods and groves. Besides, close-pruning hedge-row trees, to the height of twelve or fifteen feet, prevents their damaging the hedge; the ahelter which they affect is favourable to the vegetation both of grass and corn; it also tends to produce an equable temperature in the climate, which is favourable both to the production of greater perfection and beauty in animals, and of longovity to oma.

Though the practice of planting hedge rows of trees is very common (especially in England), though its advocates are numerous, and though these arguments are urged in its favour, yet objections are also entitled to very scrious consideration.

When trees are planted in the line of a fence, if that fence is a hedge, the plants of which it consists, will not only be deprived of a great part of their nourishment by the trees, but will also be greatly injured by the shade they occasion, and the weight of the drop that falls from them during wet weather; upon this point little reasoning is

necessary, for if we appeal to facts, we will find that no good hedge is to be met with, where there is a hedge-row of trees planted along with it.

The mischief is not however confined solely to hedges; the effects are equally bad, perhaps worse, where the fence is a sone wall; for though in this case the shade or drop of the trees, are bardly if at all felt, yet when they have attained a certain beight, the working and straining of the roos during high winds is such, that the foundations of the wall are tabken and deteroyd; a scordingly, whetever large trees are found growing near stone walls, the fence is cracked and shaken by every gale of wind, is perpetually falling into large gaps, and coust ten times the expence to keep it in repair, that would otherwise be required if no trees were near it.

Admitting, however, that the trees in hedge-rows were no way prejudicial to the fence, which we have already abewn is by no means the case, another argument may be successfully used against the practice. It is addom, indeed, that trees planted in hedge rows arrive at any great size; on the contrary, they are generally low and stunted, and while they occasion a visible loss by the mischief they do the fonce, their tumous worth, when they come to he sold, will seldom be found adequate to the loss and inconvenience they have occasioned. This is very satisfactorily accounted for from the want of shelter; trees planted in hedgerows being exposed to every inclement blast; by that means they are deprived of what is very essential to promote their growth, and which is in fact the cause, why trees in large plantations thrive better fan when they are planted singly; namely, the mutual shelter which they afford to each other; it being observed that all trees on the skirts of plantations are much lower than those more removed from the extremity; this is owing to their bearing the first gust of the wind, which after being once broke, its violence is gradually abated, and in proportion as the trees recede from the verge of the plantations, hey feel it less and rise higher.

Hedge-rows of trees are in a still more unprotected situation than those which form the akirts of a plantation, the latter being exposed to the violence of the wind only when it blows in one direction; this is what is generally termed the prevailing wind, when the gale is from any other quarter they can hardly be said to feel it; whereas, hedge-rows are exposed to the ravages of every blat, in whatever direction it may blow. There are, no doubt, some favoured upons where not only hedge rows, but even single trees may thrive, and attain a great size, without any protection whatever; the cases in which this happens, are however but few, and can in no sense be quoted in support of the general practice of planting trees in hedge-rows.

It has often been hinted, and of late strongly insisted upon, though we tlink with infinitely more zeal than judgment, that the sides of all the highways throughout the kingdom should be planted with hedge-rows of oaks. Very claborate at d highly coloured statements have been given of the advantages that would result from the general introduction of this plan over the whole kingdom; but from much teffection, and a most attentive observation, we are enabled to state, that the supposed berefits held forth by the favourers of the system of planting the sides of the bighways, in lieu of serving the public, would produce quite a contrary effect. The mischief occasioned by hedge-rows of trees upon the fences by way sides, has already been mentioned, and those who have paid sufficient attention to the subject will bear testimony, that the roads are injured in a still greater degree. The circumstances necessary to form a proper road are, a good bottom, proper materials, and a sufficient declivity for carrying away the moisture, together with a complete exposure to the sun and air : where these are united, the road is good, and lasts for a considerable time; where any of them are wanting, the reverse is the case; for instance, though the bottom and materials are of the best kind, if the road is shaded with trees or tall hedges, and excluded from the benefit of the sun and wind, that road will always be a bad one, and scarce any exertion or expence will prevent it from being so; accordingly, throughout the whole kingdom, the worst roads are uniformly met with, in situations where belts of planting run parallel to them, or where very tall hedges grow on each side. The road contractors throughout the kingdom will, from dear-bought experience, corroborate this to their cost, as they uniformly find, that in every instance where the roads are bounded either by tall hedges, or belts of planting, the expence necessary to keep them in repair is more than doubled thereby, and the road, at the same time, worse than it is in situations where they are not shaded. This is remarkably the case, if the road runs in a direction from east to west: upon roads of that kind, if the south side is bounded either by a very tall hedge, or a hedge and row of trees, no pains or expence that can be bestowed, will be sufficient to keep it in good order. The great desideratum in road-making, as already noticed, being that of forming the road in such a manner as to raise it sufficiently in the middle, and give it a gradual slope to each side, to facilitate the descent of the moisture, and afterwards exposing it so completely to the action of the sun and air, as to dry it in the speediest manner after every shower.

It must be admitted, however, that in every situation, hedge rows of trees, where they thrive, afford a degree of general shelter, and greatly improve the scenery; but these

advantages are trivial when compared to their defects; and the injury done every year both to the fences and highways throughout the kingdom is too apparent, and too genezally felt and complained of, both by farmers and road-contractors, to require any further comment.

Hedge and Ditch, or Hedge and Wall, with Bell of Planting (Pl. VII. fb. 55.)

—In the introductory part of this Paper, notice is taken of the necessity of propriefors and occupiers of ground believa at due pains to investigate accurately the peculiar
circumstances connected with its natural situation, and to regulate their plans of inclosing accordingly, as without such previous knowledge and consideration, no undertaking of that kind can be ultimately successful.

This consideration is more necessary with the hedge and belt of planting, than perhaps any other fence: in exposed situations it is strikingly useful and ornamental, while, upon the low grounds it is not only unnecessary, but in some instances absolutely hurtful. For instance, in deep and broad valleys surrounded by hills, and sheltered from severe blasts, belts of planting are not only unnecessary, but even hurtful and ruinous by the ground they occupy, which could certainly be employed to greater advantage, and the original expence of inclosing and planting saved. There are many instances both in Scotland and England, of low, flat, rich lands, being inclosed, and completely protected from the inclemency of the weather, without any aid whatever from this fence. There are other situations, however, where, though the lands are very flat, and the soil good, yet, from the want of hills and high grounds in the neighbourhood, they are so much exposed to the sea blasts, and a current of air, passing over a great extent of country without any interruption, that the value of the soil is thereby very much diminished. The peninsula which forms the county of Caithness, is a striking proof of this: with a soil of a very good quality, and highly improveable, its value is greatly impaired by the circumstance of its being so much exposed to sea winds, which coming from a very inauspicious guarter, and blowing over a considerable extent of country without meeting with any obstacle to break the force, or change their direction, blow with uncommon severity and fierceness, and in that way are an effectual check to vegetation. There are very extensive tracts in England in nearly the same situation. the whole of which might at small expence be sheltered, and rendered completely productive, by intersecting the country in a judicious manner with plantations and hedges, either separately or conjoined, as in the hedge, and belt of planting.

Thus much, as to the situations in which this fence is proper and useful. In the

formation of it considerable pains and attention will be found necessary. In every case where it is meant that the hedge and belt of planting shall constitute a durable and efficient fence, it must be made of a certain breadth; from forty to sixty feet is the very least breadth that should be allowed; and in cases where the situation is very elevated, and the intrinsic value of the soil small, the belts should be three times that breadth: such a space will allow abundant room for planting such a number of trees as will, by the mutual shelter which they afford to each other, promote their growth, and protect them against the blasts which are to severivel fit in those elevated resions.

The more effectually to promote the desirable purpose of sheltering the young trees, they should be planted very thick; p berhaps, four or five times the number that is meant to be allowed to grow to the full size, should be planted. The expence of the plants in the first instance will be very trifling, and much more than repaid, by the value of the weedings, after they have attained a certain age; with this additional benefit, that the whole plantation will grow faster, and in that way sooner answer the purpose of sheltering the lands. Planting an extra number of trees is also beneficial in another point of view, namely, that of affording a choice of the most healthy plants to be left when the plantation is thinned.

Where belts of planting are made it is common to have two sets of trees, one of fires, pines, or larches, and another of oak, ashes, and other hard woods; the first set is generally meant to shelter the second, and nurse them ill they arrive at a certain age and size, when the first set are cut down. In some instances this mode answers extremely well, but in a multitude of eases it is otherwise; the first, larches, and pines, grow to much faster than oaks, ashes, &c. as not only to deprive them of a very considerable proportion of that nourishment, which would otherwise have fallen to their share, but also, by shading and depriving them of the benefit of the light, they are drawn up in such a way as to bear more resemblance to hot-house plants, than trees that are meant to grow and encounter the blasts of a northern climate; accordingly it is too often seen, that when the first and evergreens are removed, the tender branches of the oaks, &c. are instantly affected by the nipping blasts, in such a manner, as not only to check their growth for several years, but in many instances to kill them entirely.

To remedy this inconvenience, it is necessary that the belt should be made entirely either of firs and trees of that description, or of deciduous plants, such as oak, ash, &c.; in that way the whole plantation will enjoy an equal share of the light, heat, and air; and none of the trees will shade or prove detrinental to the others. It is known from

experience, that plantations formed in this manner, if they are planted thick enough, grow equally fast, and form much stronger and healthier trees, that in eases where firs, and other trees of that description, are planted along with them.

Various modes are followed in the formation of belts of planting; sometimes they run in straight lines, sometimes serpentine, and at other times circular, or nearly so; all of which bave both use, and ornament to recommend them. Where it is meant to allow the fields to remain constantly in pasture, the serpentine and circular belts will not only look better, but will at the same time afford the most complete tablets: where the lands incline directly south, or nearly so, the belts should run from south to north, as the east and west are generally the prevailing winds in most pasts of Britain: upon a north exposure, the belts should also run from south to north, but south exposure with cross strips or belts at proper distances. By this management, the fields will be secured against every inclemency of the weather; for while the belts, which run in a direction from south to north, screen the fields from the east and west winds, the cross belts effectually secure them against the inclemency of the north and north-west galet, which in many objects, essecialty to North Britain are swerety left.

The same precaution is necessary where the lands kan cither to the east or west; in bath of these cases cross helts will be found useful, as they effectually secure the fields against every wind that can blow. The reason for omitting the cross belts in southern exposures, is very obvious; the high grounds to the north secure them from north and north-west winds, the belts protect them against the gales, that come from the west and east; the only wind, therefore, to which they are exposed, is the nouth; and from the warmth and mildness of south winds, little danger is to be apprehended from their effects.

The manner of protecting these belts is different in different aituations; a where wood is pleasy, a simple paling, or disch and paling, forms the fance; where stoness are plenty, a wall is frequently made use of; but in by far the greatest number of cases, the ditch and hedge already described (Pl. Vl. fig. 4a), or sunk fance described, Pl. I. fig. 4, which hedge upon the top, are adopted; or any of these, when properly executed, will answer this purpose extremely well; but as there are some of them better and more durable than others, and an permanence ought never to be lost sight of, either in this, or any other mode of inclosing, it is of consequence to fix upon that, which unites immediate use with durability. The stone wall, sunk fence, and ditch and hedge, are certainly the most durable; he two first are, indeed, complete at once, and every

benefit that can be derived from their use, is immediately obtained; the hedge and ditch, on the other hand, rises by very slow degrees, during which the belts are exposed both to the weather, and the injuries arising from sheep, and cattle breaking into, and trampling upon the young trees; after all, it is very seldom that a hedge which surrounds a belt of planning, forms a good or useful fence; in speaking of bedge and row of trees, the reason of this is explained at considerable length.

Where the mode of inclosing with belts of planting has been adopted, and judiciously carried into effect, the advantages have in many instances been very great, especially in high exposed situations. Upon the estate of Leston, in East Lothian, a striking instance of this is met with: a part of that estate is situated on the declivity of a range of hills, known by the name of Lammarmuir, leaning to the north. About twenty years ago, a part of the lands were inclosed with belts, consisting chiefly of firs, with a mixture of larches: the situation was then so bleak and exposed, and the soil seemingly so bad, that the neighbouring proprietors laughed at the attempt, predicted that it would be abortive, and considered the owner a fool, for laying out his money upon so unpromising a subject. A few years, however, gave them a better opinion, both of his intellects and his undertaking; the trees throve from the first, and in a short time, the benefit arising from their shelter was sensibly felt. The bleak uncomfortable appearance which the fields formerly exhibited, began to be changed, and a better and more valuable berbage sprung up. This alteration has been progressive, the pasture is now good, and the fields so completely inclosed, as to bid defiance to every wind that blows.

In consequence of this change, the soil, which in its original state produced nothing but heath, fern, and some of the very consent grazes, and was not worth a shilling an acre, is now rented at twenty, and not considered as a dear bargain; yields very good passure; and notwithstanding its elevation above the level of the sea, and a north exposure, a part of it has lately been ploughed, and produced very good crops of grain. The sheep and young cattle that are reared and fed in these fields, owing to the complete shelter they eighy, and being left undisturbed by herds, or dogs, thrive amazingly; and in winter, when the weather is inclement, the flocks from the neighbouring heights are drove into these inclosures during the night; and in that way are not only better schelered, but the standance of servants is rendered unnecessary.

To the above advantages we have 10 add, that the thinnings of these belts have much more than repaid the expence originally incurred in making them; by affording great quantities of wood for paling and for building, and keeping the houses and cottages upon the estate, and its immediate vicinity, in repair. After all, the number of irces still remaining, and which we hope the good sense of the present proprietor will allow to stand, would, if cut down and sold, be worth from  $\int_{\mathbb{R}} g_0$ , to  $\int_{\mathbb{R}} t \cos \mu dt$ acre.

Another very striking instance of the advantages arising from this kind of inclosure is met with, in the immediate neligbourhood of Isaddington, in the same county, upon the property of the Rt. Hon, the Earl of Wemyss. A tract of land of about three hundred acres, on the side of a hill leaning to the south, was inclosed with belts, or as they are called strips, of planting; these strips run from north to south, in such a way as to divide the who le into fields, of from thirty to forty-five, and one of the fields contains seventy acres. Before they were inclosed, from the great clevation they were exposed to, they suffered severely from the east and west winds; the fields are mearly an English mile in length each, with a gradual ascent the whole way; and a part of the soil, especially that nearest the summit, rather thin, and of an inferior quality; the whole has been let for many years in pasture at a good rent, are now farmed upon a seven years lease for tillage, at five guineas per sere, while the lands on each side, which are not inclosed in that way, are scarcely worth twenty shillings.

PL. X. fig. 60. represents a part of these fields in perspective.

Many other instances could be adduced of the advantages, arising from this kind of inclosure in exposed situations; indeed, in such cases, it is the only one that should be had recourse to, as it unites every requisite of beauty, shelter, and inclosing. It has this farther advantage; that, whereas in other instances, the ground occupied by the fence, is cither entirely, or in a great measure lost; in this case, it is annually improving in value by the growth of the trees, which at once afford wood for making fences, for building and labouring utensits, and, what in many dutrites is a very important acquisition, fewel for the poor; and in not a few instances, the branches or prunings have been in severe winters converted into food for sheep, and other animals, especially the prunings offin, larche, &cc.

In conclusion; we earnestly recommend this mode of inclosing, to the proprietors and occupiers of all high exposed grounds; as, from an attentive observation of its effects in such situations, the advantages arising therefrom, have been found to exceed even the most sanguine expectation.

Hedge and Ditch, or Wall, with the Corners planted, (Pl. VII. fig. 56, and Pl. VIII.

fig. 57.) It is common upon some estates, instead of the belt of planting, to plant only the corners of the fields, as in the figure. Upon an extensive property, and where the fields are not very large, this mode of inclosing has a good effect upon the scenery of the country, and answers the purpose of general shelter extremely well. It certainly has a more pleasing and natural appearance to the eye, than the stiff formal look of a number of straight belts running in parallel lines; it is, however, greatly inferior to the belt of planting, for the purpose of sheltering particular fields. But as in every field. there is a space in each angle that cannot be ploughed; by planting these spaces, which would otherwise be left waste, the country is thereby ornamented, and many valuable trees raised with little expence, and with scarce any waste of land. This plan is particularly recommended by Dr. Falconer, in the Staffordshire Report, in the following words. " In every act for an inclosure, let there be a clause obliging the proprietor " of the new inclosed land, to plant a certain number of oaks, in proportion to his " share of the inclosure, and directing the plantations to be made in the angles of the " fields; by adopting which plan, a less quantity of posts and rails would be required. " and the angles of each field would be converted to a profitable use, and corn would " grow close up to the rails; whereas no corn will now grow in such angles. This " is not the only advantage that would arise from this plan; the trees full grown, would " afford good shade for cattle, and an easy communication through these plantations. " would be from field to field. It would also be very ornamental to the country."

Circular Bell of planting. (Pl. IX. fig. 58, and Pl. X. fig. 59.)— This mode of inclosing has hitherto been but little followed, though much benefit may certainly be derived from it; especially in the hills and uplands. The danger to which sheep are exposed in these situations during winter, is well known; numerous flocks being sometimes buried in the snow during the night, and not unfrequently the lives of the shepherds lost, in attempting to drive them to a place of greater safety. In the reprinted Survey of East Lothian, a Mr. Brodie, a very intelligent farmer in the uplands, proposes, that upon all store farms, there should be one or two circular inclosures, of at least six or eight aeres in extent, planted pitick with trees, and from an aere to an aere and a half, left unplanted in the middle, as in Pl, IX. fig. 58, with a serpentine road

Others doubt the utility of this practice, as, in point of fact, the greater number of such corners
are necessarily occupied by gateways that could not, without considerable inconvenience, and inereating the farmer's labour, be dispensed with.

leading from the outside to the centre; and that during storms, or when there is any teason to apprehend a fail of snow, the sheep may be drove into them during the night, where they will be lodged in safety, and no herd required to attend them; and in bad years, such as the winter 1794-5, when the snow fell very deep, and continued for several months; during which, the farmers were under the necessity of feeding with bay, the sheep may be comfortably lodged, and fed in these inclosures; with this additional benefit, that if due pains are taken to litter the space in the middle with straw, heath, fern, or even peat earth, a very great quantity of valuable manure will in that way be obtained, which would otherwise have had no existence.

The red fence has hitherto been but little used, except in gardens, for the protection of melon grounds, &c. and is constructed in the following manner. The space meant to be inclosed, is first surrounded with posts and rails, exactly resembling the fence known by the name of post and rails; when the wood work is finished, the reeds are applied perpendicularly in bundles, quite close to each other, and fastened to the post and rails, either with common rope yarn, the bark of trees, or ropes made of straw: when properly constructed, this fence lasts a considerable time, and affords the most complete shelter.

In some cases, the reads or thatch (for this last article will answer the purpose equally well as reeds), are applied only on one side of the post and rails; in by far the greatest number of instances, however, they are applied on both sides; in that way the posts and rails are entirely concealed. This last is certainly the most complete method, and makes at once a more lasting fance, and one that is more agreeable to the eye. For temporary purposes in sheltering cattle, that are fed in open straw yards through the visiter, and for prosuccing persons employed in hewing and preparing materials for buildings, the reed fence seems well adapted, and upon trial will be found to cost less money, and afford better abelter, than the wooden huts that are commonly rected for these purposes.

Gates.-Many different kinds of gates are used in different parts of the Island, but the principal are,

- 1st. The swing gate.
  - 2d. The folding gate.
- 3d. The slip-bar gate.
- 4th. The wicket, or turn-about gate.

Pl. XII. fig. 67, 68, 69, represents the swing gates most commonly used. These,

from the great length of the bars, and the weight upon the hinges, are found to be very expensive; for unless uncommon pains are taken to bind them very strongly together, the joints give way, and the gate falls to pieces; or the hinges being overstrained by the great length of the bars, are either drawn or broke; this is therefore to be considered as a bad and an expensive state.

Pl. XII. fig. 70, and 71, represents the double or folding gate, which from experience, is found to be much more durable than that already described; the bars being only half the length, the joints of the gate are not liable to be broke, nor the hinges hurt by strainings; and the difference in the original cost consists only in the write of any additional twir of hinces.

Pl. XII. fg., 7a, represents the slif-shor gate. This is perhaps the most durable of any, especially where the gate-posts are of stone, with proper openings left for the reception of the bars. The only objection that can possibly be made to the slip-bar gate, is the trouble of opening and shutting; which, when servants, or others, passing through it, are in a hurry, occasions its being frequently left open. In other respects, it is preferable to every other description of gates, both in the original cost, and greater durability. It is to be noticed, however, that upon the verge of a farm or estate, especially where it is bounded by a high road; the slip-bar gate will not answer, as it does not admit of being locked, or secured in the same way as other gates; but in the interior of a farm or estate, it will be found the cheapest and most convenient.

Pl. NII. fig. 73, and 74, represents the turn-about, or wicker gates. These are used only in eases, where there is a necessity for leaving an entry for the people employed, to pass backwards and forwards. This purpose they answer very well, and at the same time keep the field completely inclosed, as they require no trouble to shut them.

Gate Posts.—These, where circumstances will admit of it, should always be of stone, and if possible, hewn stone; which, when properly constructed, lasts for ages. In many places, it is customary to plant rees for that purpose, and after they have attained a certain size and thickness, to cut them over about ten feet above the surface: where the trees thrive, they form the most durable of all gate-posts; in many instances, however, they migrey, and much rouble is necessary to repair the defect. Where the posts are made of dead timber, they should be strong, and the wood well prepared; that part which is let into the earth should be defended, by dipping it in coarse oil, or giving it a coat of Lord Dundonshold's coal variable, as formerly mentioned for the

different kinds of paling; and all that is above ground exposed to the weather, should be well covered with one or two coats of oil paint; the expense of this preparation will be very small, and the benefit arising therefrom considerable.

There are also some stone silles, very common in Derbyshire, and other parts of England, some sketches of which, transmitted by Mr. Brown of Lauton, are included in the annexed engravings; Pl. XII. fig. 75, is one of a very simple construction. At the bottom is a thin flat stone set edge ways, to prevent sheep gening out, and above, there is a cross stone or bar, to prevent shores and cattle jumping out. Pl. XII. fig. 76, and 77, require no particular description. Pl. XII. fig. 79, is called the Corraudil or Certain bitle. The foundation of this site is a stone wall, in which a gap is left; and stones are laid across a dict of some depth, made lengthways in the gap: the foot-passenger steps on the stones, but four-footed animals mits them, and fall into the disch. Pl. XIII. fig. 78, is the simplest and best construction, where the traffic is not great. In the construction of silles, much must depend upon the nature, and shape of the materials; according to which, the nature of the frence, and the extent of traffic upon the road, the intelligent workman will execute the plan that is thought to be the most eligible.

## CONCLUSION.

Having gone over with a degree of minuteness, which to many readers may convey an idea of trilling, the different indist of inclourers, made observations upon the mode of executing each, and pointed out some of the principal benefits arising from the system of inclosing; we beg leave, in conclusion, to state its effects upon the popul-wision, manufacturers, wealth, and public revenue of the kingdom. These are points of the highest importance, and entitled to the most serious, and attentive consideration.

It has been asserted by some able writers, especially the late celebrated Dr. Price, that the population of Great Britain has been meterially diminished by inclosing the lands, thereby depriving a number of hands, formerly emplayed in the labours of the field, of employment: as the opinion of such a distinguished character, upon a subject of high national importance, cannot fail to have great influence upon many minds, it is entitled to a strict and unprejudiced examination. Before emering upon this, it is necessary to observe, that Dr. Price, however accurate his opinious, or calculations might be, when founded upon sufficient data, took certain things for granted, and founded upon them, which if he had been possessed of more experience or better

information, he would have disregarded. That this was the case in a remarkable degree, upon the present subject, is now so very notorious, that it may perhaps appear a waste of time, and an offence against the patience of the well informed reader, to repeat so pulpable an error.

Were agriculture the only employment of the inhabitants of Great Britain, the produce of the soil their chief aupport, and the sole source from whence every thing connected with the necessity, confort, and elegance of life was drawn; it would in-evitably happen, that every contrivance, whether by inclosing the lands, or otherwise, that could in the smallest degree tend to diminish manual labour, would horve a number of persons out of employment, who would necessarily be obliged to seek a subsistence, by emigrating to other countries; in that way, the population of the kingdom would be immediately and materially affected. This conclusion must be very apparent to every person, who has considered the matter with due attention.

Let us however (which is really the fact), consider Great Britain, along with its agricultural products, as a warlike, a manufacturing, and a commercial nation; the picture is reversed, and the abridgment of labour, whether by inclosing, machinery, or other contrivances, will be found, in place of injuring, to favour population.

It cannot be disputed, that when a farm is well inclosed, and put under a proper rotation, with a certain proportion of it in grass, the stationary servants upon such farms, in most cases, will be reduced more than one third; and in a great many instances, fully one half: but though we admit this, we are at the same time satisfied, that the number of occasional labourers required for ditching, trimming, and cleaning hedges; and for hand-hoeing, hand-weeding, and other operations connected with an improved husbandry, will much more than compensate the climinished number of sationary servants: as every farmer will finde employment for a great number of hands, for the labours already enumerated, and what is no small recommendation of this system of husbandry, a great part of the work admits of being done by old people, women and children.

Indeed, the slightest observation must impress every intelligent mind, that in proportion to the perfection in which any country is cultivated, its produce will be increased; of course, the greater the number of hetad will it-feed and employ. To what is the great produce and fertility of gardens owing, but to the superior care and attention bestowed upon their cultivation? We are still ignorant to what length the productive powers of the earth may be carried; they are certainly very great; and were every description of plants, but such as are necessary for the sustenance of man, and the other animals, extirpated, the produce of the soil would be increased, not in an arithmetical, but a geometrical proposition, to the quasatum of labour bestowed upon it. Were the same pains taken, and the same number of hands employed in cultivating the fields, and in picking and destroying weeds, many extensive tracts might be rendered equally productive, as the best garden ground. It is obvious, however, that this system of husbandry admits of being practiced with success, only upon inclosed fields; and that inclosing must, in all exacts, be a previous sep to its introduction.

This last argument is conclusive in favour of inclosures. It is admitted on all hands, that the system of husbandry, which a farmer is enabled to pursue upon inclosed property, has an immediate tendency to increase the produce of the soil, and afford employment for an additional number of people; while, at the same time, be has it in his power to diminish the working stock and stationary servants, nearly one half; the saving of corn, and other food required for the support of their borses, together with their original cost, the expence of stationary servants, harness, &c. &c. may be safely added to the account.

The question appears a proper and natural one, how is this extra produce to be employed? It on which we answer, either immediately, in supporting an increased population, or remotely, in furnishing the country with an article of export, consisting either of the grain itself, or the products drawn from it, such as spirits, beers, porter, &cc; all of which are highly piraced, and bear a great price in foreign countries. In a subsequent part of these observations, we shall have occasion to enter more at large into this part of the subject, as connected with the national wealth, and revenue; in this place it is only necessary to observe, that though by the assistance of inclosing, and an improved husbandry, the numbers of borres and stationary servants upon every farm are evidently dismished, yet the number of persons required for occasional labour, are as certainly increased; and in that way, the expensive (and in many instances unproductive) labour of an additional number of human beings.

This is the immediate effect of inclosing, which, even in the outset is highly favourable to population; but if we carry our view forward to its remote benefits, they swell upon the sight, and assume an appearance of vast importance.

As far as population is concerned, in every instance where it is admisted, thet either by inclosing, or any other contrivance, employment is provided for an additional number of hands, and a comfortable and certain subsistence is to be carried from such employment, the inducement to marriage, and the intercourse of the exces, will be strong, and their effects eertain; by that means a rising progeny will be produced, not merely adequate, but (as is always the ease) more than sufficient for the labours of the district in which they are born, and a surplus will be spared for other employments. The petty mechanic, or labourer, who has been fixed to a certain spot, and bas brought up his family by constant labour and self-denial, while he is from experience convinced of the certainty of a subsistence from such persevering industry, as long as his health enables him to prosecute his employment, will not, if he possesses common sense, be blind to the advantages to be met with in other walks of life.

Under such impressions, he will naturally educate his children for different professions, according to their indination and his abilities. By that means, a certain proportion of the children, of those who cultivate the soil, will be qualified to fill other stations. The army, the navy, manufactures, the fisheries, and commercial puratis, will of course present themselves, and he readily embraced.

The popular theme upon the subject of inelosing is well known; and many men, from whom more enlightened and extended ideas might have been expected, have added their voice to the general and unfounded clamour. It is certainly not unworthy of notice, that the same objections have been made, and the same reasons urged, against the introduction of machinery in various branches of manufactures; ye it is notorious, that in every instance, where machinery has been applied for the purpose of lessening manual labour, the manufacture has extended itself, and been the means of inereasing both the wealth and population of the kingdom.

The outcry that was made against spinning and stocking machines, is still recent in the remembrance of many; the reasons assigned were, that the women would be deprived of enphoymen, in the principal line in which their industry would be exerted (spinning); and that by the introduction of stocking frames, many who had formerly lived by knitting stockings by the hand, would be thereby rendered destitute.

The same resistance has been made to the different improvements in agriculture:—
thrashing machines were reprobated, as they would deprive that description of men of
a subsistence, who formerly lived by thrashing grain by the hand. They bot test ploughs,
one of the most valuable of modern improvements, were exclaimed against, for the
same reason; and though the number of horses, and stationary servants, were by that
means alone reduced one half; it was gravely unged, that it would not only deprive

many persons of employment, but in the end induce a scarcity of servants; as when there were no plough drivers to learn the management of a plough, while they were young, there would be none to replace the old ones when they were wore out. It is the same with regard to inclosing, which has been represented as so very unfavourable to population, by depriving a great number of persons of employment.

Experience, and facts which cannot possibly be denied, prove that the fears entertained upon these subjects were groundless; and a conviction of the utility of machinery, and other contrivances for shortening manual labour, both in agriculture and manufactures, has now made converts of their warmest opponents; but it required nothing short of the experience we have had of these advantages, to subdue obstinacy or enlighten ignorance.

Amongs the lower ranks of society, whose minds are uninformed, the aversion to any improvement that has a tendency to shorten labour, even in the slighest degree, is exceedingly natural; unacquainted with the immediate benefits, and incable of carrying their views forward to the remote advantages, that may result from auch inventions, they foresee, in their adoption, only a diminution of their own importance; and by observing that fewer labourers are required for certain purposes, they are haunted with the apprehension of being deprived of employment, and their familiae reduced to want; in that way, feeling, not reason, decides their opinion; whereas, where they to look round them, they would observe that new inventions and discoveries, whether in manufactures or rural economy, always bring in their train of additional employment for many hands, and an increase of comfort and profit to all concerned. Let the situation of the farmers and their servants foroughout Britains, fiby years ago, be contrasted with their present ameliorated condition,—the picture will no doubt appear striking.

A very natural inquiry arises from this comparison; to what is this great difference in the condition of these people, owing? unquestionably to an improved system of lust-bandry, the increased demand for labourers of every description, the advanced price of labour, and the ready sale and high price of the products of the earth.

Upon certain subjects, facts are so strong as to preclude the necessity of reasoning; the present is of that description; in every point of view, inclosing is highly advantageous; the produce of the fields is thereby increased, food is provided for an additional population, labour is diminished, by which means the greatest possible produce is raised at the least expence; and by rendering the necessaries of life plentful and

cheap, our manufacturers are enabled to conduct their operations at less expence, and by that means undersell other nations where living is dearer, even in their own markets. This last is matter of great importance; as a preference thereby arise to our manufactures, and a preponderance is given to the scale, that settles the balance of trade in our fivour.

Hitherto we have considered the increased produce, as appliciable chiefly to the support of an additional population; we will now earny our views anomewha farther, and
consider grain, or the products drawn from it, as a bulky and valuable export. Perhaps the policy of government will take care to prevent much of the grain from being
exported, in a unmanufactured state; but the ame wisdom which dietates the propriety of preventing the exportation of grain, will point out the utility of encouraging
the exportation of the products drawn from it; as the a spirits, starch, &c. &c.; these products, when exported, not only bring into the country much more money than the grain
itself would have done, but afford employment for many people, and are productive of
great advantages to the agricultural interests of the nation, by the quantity of manure
that is produced, and the number of bogs and castle that are fed by the distillers,
brevers, and starch makers.

The experience of ages convince us that, even in the best years, the produce of the kingdom seldom greatly exceeds the consumption; and that, taking one year with another, it is barely adequate to it: this leaves little surplus for any misfortune arising from bad seasons; the calamitous year 1782, and the scarcity and enormous price of grain in the years 1795 and 1796, are proofs of the truth of this; during these two last years, the money paid for grain imported was nearly three millions sterling; the bounties paid by government amounted to £573,418. 4s. od. making together almost four millions; if to this, we add the loss sustained by the revenue from the stoppage of the distilleries and starch works, and the money sent out of the country for the purchase of foreign spirits, starch, &c., the whole together will amount to an immense sum in the present state of the country, and sufficient to arouse the attention of the legislature to prevent a similar misfortune. This, it is admitted by intelligent men, can only be done by a strict attention to the improvement of our agriculture, and giving due encouragement to every thing that can send to perfect so valuable an art. Next to tillage, and the use of manures, inclosing bids fairest to accomplish this desirable purpose; even upon the present arable fields, which from their remaining open are in a defective state of cultivation, its advantages are very great; but upon lands that are entirely waste, they are still more considerable; the value of the former is, in many instances, more than doubled: upon the latter, a quantity of provisions equal to all they produce, whether in com or cattle (and which would otherwise have had no existence), is added to the common stock. In this last case, the question of population is in no respect doubful; if a trac formerly barren, is inclosed, and either converted into pasture, or brought under the plough; employment is thereby found for a number of people; and a spot which, while in a waste state was useless to the community, becomes valuable in a double point of view, by adding to the stock of provisions, and affording employment for an additional number of bands.

A nation is accounted rich, in proportion to its resources, and strong, in proportion to its population, and means of defence. Inclosing has evidently tended to increase both the resources, and population of Britain. If this is admitted, the increase of the public revenue follows as a master of course; for the greater number of inhabitants that live in any country where taxes are paid [and in the present state of society they are unavoidable], the greater quantity of taxable commodities will be consumed; consequently, the national revenue will be interested in the same proportion.

Before we take leave of this subject, we judge it necessary to observe, that when the strength and riches of a nation are spoken of, they are very seldom estimated by their true standard, antional strength in all cases implying the number of inabbitants, and national wealth, the produce of their joint labours, whether arising from agricultural manufactures, or commerce. In the first estimate, it is often forgot, that when the gross population of a country is taken, the number of persons who are capable of active exercion, and whose labours add something to the common stock, bears but a small proportion to the total amount; and when the gross produce is mentioned, the number of bands required to raise is; is as frequently left out of the amount.

National strength, undoubtedly depends in a great measure upon the number of inhabitants, but it is only upon the numbers who are capable of active exertion, in one way or other: and though national wealth, and public revenue, consist in the annual income, arising from the joint labours of the community; yet it is perfectly certain, that the true criterion of the wealth and independence of any people, is to be met with, in a comparison between the numbers, and the produce. In other words, the nation that is able to realize the greatest annual produce with the flewest hands, and at the least possible expence, is the richest and most independent. In this respect Britain stands unrivalled; many of the noblest inventions, of which the human mind is

- capable, have lately been introduced, and applied to the useful purpose of life. In consequence of which, manual labour has been so much abridged, as to enable the incchanic and manufacturer, to bring to market articles of superior quality, at leas than a third of the price which they would have cost twenty years ago; owing to that cause, our exports have increased in a very uncommon degree, and we are now enabled to supply other nations with many articles of luxury, and even of necessity, which we formerly imported from them.

The dress and appearance of all classes of society, is another proof of this remark; the extension of every manufacture, where machinery has been introduced, the increased demand for workmen, and the high wages given, are conclusive proofs, that the application of machinery to manufactures, is highly favourable to population. It is the same with regard to agriculture, for though by inclosing, the introduction of two-horse ploughs, and thrashing machines, fever persons may be wanted for certain purpose; yet a number, far exceeding the persons formerly employed in these branches, will be required for other labours. Let it also be remembered, that even in the High-lands, and grazing districts, where inclosing tends without all question to dinnish population; yet the progressive improvement of other districts, by opening new sources of wealth and comfort, finds ample employment for all the hands that are rendered unnecessary in the grazing countries, in new and hitherto unknown branches of industry, which not only admit of the labours of the young and vigorous, but afford a profinable employment for children, who are unfit for other labours, and even for decrepticale and old age.

Let us for an instant suppose this country in such a situation, that the number of inhabitants was barely adequate to the present labourn in agriculture, and manufactures; under such circumstances, no attempt even to extend the present, or introduce new arts or manufactures, could be successful for want of hands. For though by high wages, people might be tempted to forstee their former avocations, and embrace this new employment; it is evident, that these hands must be drawn either from the plough, or some manufacture formerly established. In such case, the new art or manufacture could only be established at the expence of the agriculture, or former manufactures of the country; in that way, the nation would be in no respect benefited; as whatever was gained by the new art, would be more than counterbalanced by the check and discouragement given to the old.

But if in a country so circumstanced, where the population is barely adequate to

the labour required for agriculture, and the other established branches of industry, machinery, or other contrivances can be introduced, that have a tendency to diminish manual labour in the whole, or any one of these branches, it is evident, that a number of hands will by that means be spared for any new undertaking; and in that way, the country would reap every advantage that could possibly arise from thin new art, without the smallest detriment to the old. For, as has been already hinted, it ought never to be forgos, that though some idea of the industry of a nation may be formed by knowing the number of hands actually employed in the useful arts, the perfection of these arts depends upon that nation being able to bring to market the greatest quantity of produce, with the fewert hands, and at the least possible expends; for numbers without industry, constitute a wasteful and consumptive population, which, instead of serving any valuable purpose, has a tendency to diminish the national wealth, and destroy its resources.

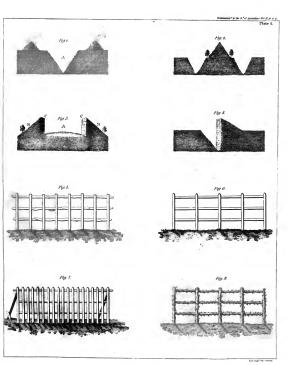
## EXPLANATION OF THE PLATES.

PLATE I. fig. 1.	An open dutch, with the earth taken out of it collected into heaps, and burning for manure; a practice in some of the English counties.
fig. 2.	A double ditch, with the earth taken out of both ditches, formed into a bank, and laid up between them.
fig. 3.	Section of a road or highway, bounded on each side with a bank, having a perpendicular facing of sod on the side next the road, and sloping gradually towards the fields; on the other, with a hedge planted at the bottom of the slope.
fig. 4.	A sunk fence faced with stone.
fig. 5.	Horizontal nailed coarse rails, made of common sawn wood, without any other dressing.
fig. 6.	Jointed horizontal rails, made with dressed wood, and jointed in- stead of being nailed.
fig. 7.	Upright lath paling, made with light sawn laths, and supported with rests at proper distances.

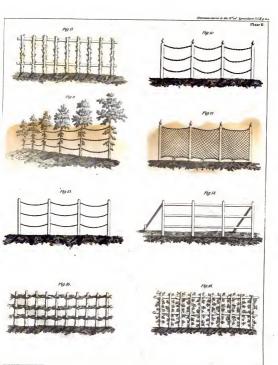
112	Observations on the
PLATE I. fig. 8.	Horizontal fir paling, made with weedings of young firs, with the lateral branches trimmed off, about two inches from the stems.
PLATE II. fig. 9.	Upright paling of young firs, with the branches left in the same situation.
fig. 10.	Chain fence, made with upright posts drove into the earth, and chains stretched between them.
fig. 11.	Chain fence, with trees instead of dead posts, and the chains fastened to hooks or staples, drove into the trees.
fig. 12.	Net fence, made by driving massy upright posts into the earth, and stretching nets between them.
fig. 13.	Rope fence, made by driving upright posts into the earth, and stretching ropes between them.
fig. 14.	Moveable paling, flake, or hurdle fence.
fig. 15.	Osier or willow fence.
fg. 16.	Paling of growing trees.
PLATE III. fg. 17.	Upright lath paling, or park palings.
fg. 18.	Horizontal lath paling.
fg. 19.	Warped paling.
fig. 20.	Open nailed paling, warped with thorns.
fig. 21.	Common dead hedge.
fg. 22.	Dead hedge bound together at top; used in many parts of England.
fg. 23.	Dead hedge with upright posts drove into the earth, and warped with thoms, or stack and rice; or, as it is termed in Scotland, stake and rice.
fig. 24.	An old hedge cut down, and a gap in the middle of it, mended by bending down one of the old plants into the opening, fastening it down with wooden hooks or pins, and covering it with earth; when this is properly done, it sends up a num- ber of strong young shoots, which completely fill up the opening.
PLATE IV. fig. 25.	A hedge mended in the above manner, and the opening pro- tected by a coarse paling.

PLATE IV. fig. 26.	An old thorn hedge cut down, and an opening filled up with young beeches, protected by a paling.
fig. 27.	A hedge mended with dry stones; a very bad practice.
fig. 28.	The common quick hedge, to be seen in many parts both of
jig. 20.	England Scotland, with the stems of the plants cut about half through, then bent down a little, and bound together at top with willows or hazels.
fig. 29.	A quick or white-thorn hedge with the foliage upon it, trained in such a manner as to leave it broad at bottom, and taper- ing gradually towards the top.
fig. 30.	An old hedge cut down, with the first year's growth of young
J.g. 30.	shoots upon it, after cutting.
fig. 31.	Another old hedge cut down, with a part of the old stems left
30.0.	uncut and warped with it, to fill up the gaps.
fig. 32.	A whin hedge on the top of a bank faced with stone.
PLATE V. fig. 33.	A whin hedge on the top of a bank.
fig. 34.	A stone wall coped with brick.
fig. 35-	A stone wall coped with sod.
fig. 36.	A galloway dike or wall.
fig. 37.	The front of a brick wall.
fig. 38.	A turf wall,
fig. 39.	Turf and stone wall.
fig. 40.	A mud wall, with a mixture of straw.
PLATE VI. fig. 41.	Frame of a mud wall.
fig. 42.	Hedge and ditch.
fg. 43.	Hedge and ditch, with a coarse open wall upon the top of the
	bank, to protect the young thorns,
fig. 44.	Hedge in the face of a bank.
fig. 45.	Hedge at the bottom of a bank.
fig. 46.	Hedge on the top of a bank.
fig. 47.	Devonshire fence,
fig. 48.	Hedge and paling.
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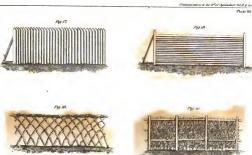
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PLATE VII.fig. 49.	Hedge, with a dead hedge on the top of the bank, to protect the young plants.
fig. 50.	Hedge and wall.
fig. 51.	Hedge on the top of a wall.
fig. 52.	Hedge in the middle of a wall.
fg. 53.	Section of hedge and ditch, with row of trees.
	Front view of hedge and ditch, with row of trees.
fg. 55-	Hedge and wall with belt of planting.
	Perspective view of an inclosed field, with the corners planted.
PLATE VIII. fig. 57.	Plan of four fields, with the corners of each planted.
PLATE IX. fig. 58.	Circular inclosure consisting of several acres, with a large area left in the middle, for sheltering sheep in hilly countries dur- ing snow.
PLATE X. fig. 59.	Another circular inclosure for the same purpose.
fig. 60.	Belts of planting.
PLATE XI. fig. 61.	A back view of a brick wall, supported by pillars to strengthen it.
fig. 62.	A back view of a stone wall heightened with brick, with pillars to strengthen it.
fig. 63.	A stone wall with a light paling on the top.
fig. 64.	Section of a double ditch and hedge, with a row of trees on the top of the bank between them.
fg. 65.	A frame and plummet used by masons in the building of dry stone walls.
fig. 66.	Section of a dry stone wall.
PLATE XII.	Gates and stiles.































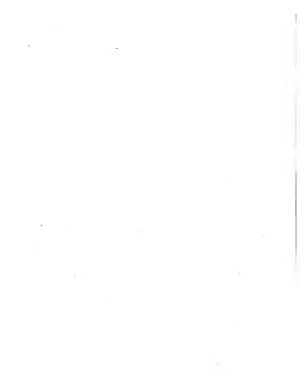














Fig. 39

Fig. 39

Fig. 30





PlateVi





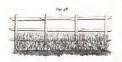


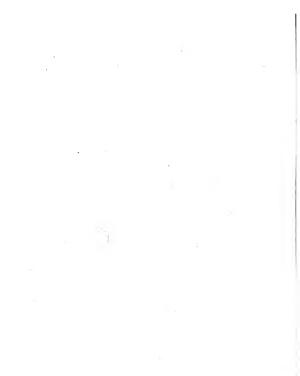












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Plate Vil







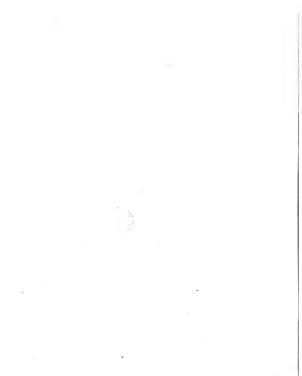




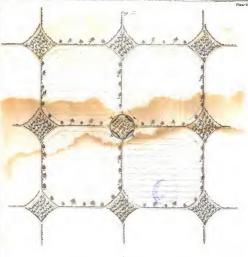




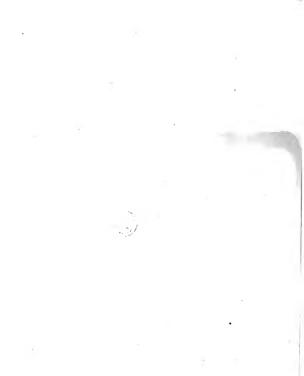




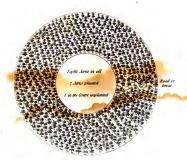




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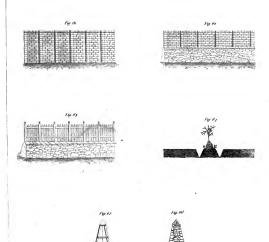
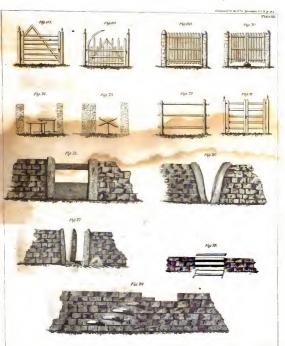
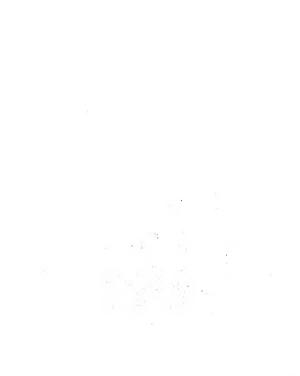


Plate X

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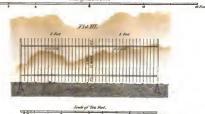


FIG. II. or Mair untal Mires Terne, was applied about 16 Years up by M. Grent at Malliam Place Live by the left of Malli Phop of Joins the Joins of the openior was for the New 62 ft comming two Copy Lind Hour of Machinum hip 62 move; we in all 616 ft 12 his Mires Michael and develop and devole requiring only a little from Lind 2 his decongrand

Dut he prefer 13th Mor perfeculialise Wire force, which has been exected at Six behn full and Whiteford Manne, near bullington. Command about 20 Years to she thinkyn stronger France of butter calculated to be off butter or Marp from Honner Growners by means of the pointer Circ. than the boris outed france. But he believes the corporare will be double that of the Horizontal france.